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The Bureau of Reclamation

MICHAEL W. STRAUS, *Commissioner*

WITH the cessation of hostilities in the fall of 1945, the Bureau of Reclamation immediately revised its budget request and in turn it received appropriations by the Congress of approximately 90 million dollars to resume a normal construction program. The Bureau's program during the war years had been definitely curtailed and limited to those projects which were believed by the WPB to be of assistance to the war food program and to such projects as would produce quickly large blocks of electrical energy.

To facilitate the quick resumption of construction activities after wartime restrictions were lifted and to eliminate a considerable amount of time and effort in awarding construction contracts, the Secretary of the Interior delegated to the Commissioner of Reclamation authority to approve change orders and award contracts up to $500,000 in lieu of his previous authorization of $50,000. In turn the Commissioner delegated to the Chief Engineer, to the Director of Supply, and to the Regional Directors authority to award contracts and approve change orders up to $50,000. These delegations of authority assisted in expediting the purchase of materials and equipment and the initiation of construction on the Bureau's multimillion-dollar program.

The resumption of construction work on the Bureau's projects will provide irrigation water for many million acres of arid lands and thereby provide homesteads with unlimited opportunities for the returning veterans and will immediately provide a large number of man-hours of work both for returning veterans and unemployed war workers in jobs extending to factories producing materials and equipment for construction.

The year 1946 marked the beginning of the most extensive production program that has been proposed for the Bureau of Reclamation in any one year since the enactment of the Federal reclamation law in 1902. The construction of dams, pumping plants, canals, siphons, water distribution systems, power plants and transmission lines are included in the well-balanced development of the natural resources of the 17 Western States planned to create in 5 years more than 45,000 family-size irrigated farms on about 4,000,000 acres of productive lands.

TABLE 1.—*Summary of contracts executed in fiscal year 1946*

Nature of contracts	Number of contracts	Amount[1] involved
Cooperative investigations	17	$227, 475. 00
Supplies	196	289, 419. 05
Material	676	8, 840, 311. 71
Equipment	593	3, 420, 978. 58
Miscellaneous services	495	793, 487. 22
Construction work	112	45, 179, 723. 78
Land purchases, including improvements	386	696, 821. 25
Land sales, including improvements	7	21, 317. 00
Leases to the United States	162	195, 976. 53
Leases from the United States	658	430, 128. 95
Compromise of damages	0	0
Rental of Government equipment	112	19, 126. 68
Rental of water	293	237, 847. 09
Sale of surplus electrical energy	35	329, 291. 12
Sale of water rights to towns	0	0
Sale of water rights under the Warren Act	10	106, 959. 90
Sale of water rights within projects	32	113, 714. 10
Adjustment and relief	3	10, 962. 52
Transfer of project operations	0	0
Miscellaneous	187	3, 055, 987. 64
Acquisition of rights-of-way	34	52, 600. 00
Acquisition of water rights	5	27, 000. 00
Interim water service	6	100. 85
Total	4, 019	64, 048. 628. 97

[1] Estimated, in part. Many of the contracts awarded in fiscal year 1946 will be executed in fiscal year 1947.

Missouri Basin Construction Starts

Construction work on the Missouri River Basin project was started to advance the comprehensive over-all program for the complete development of the land and water resources of the arid, semiarid and subhumid areas of this river basin which includes one-sixth of the land surface of continental United States.

During the year 52 irrigation and power projects were in operation. Much of the power output from these projects went to airplane, aluminum, chemical and other industries classified as essential to Allied victory. Approximately 5 million people, amounting to nearly one out of five persons in the West, were served through the Bureau's irrigation, power, and municipal water service made possible by 44 years of construction work on Bureau of Reclamation projects.

Water Conservation and Utilization Progress

Construction activities on eight Water Conservation and Utilization projects were continued or resumed during fiscal year 1946. The Post Falls Unit of the Rathdrum Prairie project, Idaho; the Intake project, Montana; the Newton project, Utah; and the Scofield project, Utah, were completed during the year.

The Fallon Unit of the Buffalo Rapids project—second division, Montana; the Mirage Flats project, Nebraska; the Rapid Valley project, South Dakota; and the Dodson Unit, Milk River project, Montana, are scheduled for early completion.

Funds are available for continuation of construction of the Eden, Wyo., and the Mancos, Colo., projects, but work is dependent on repayment and related considerations. Work is continuing on the Balmorhea project, Texas.

Civilian public service crews, under the Selective Service Program, continued work on three Reclamation projects during part of the fiscal year and helped to relieve to some degree labor shortages, which existed at that time, in continuing construction and development work. Work by these crews was gradually reduced so that by the end of the year none of these camps was in operation.

Veteran Settlement and Land Development

During the past year, Bureau projects stepped out with tangible accomplishments in making new lands available for settlement to veterans. Public lands on a number of projects have been readied for openings during the fall of 1946, and new private land farms received first irrigation water during the current irrigation season.

The importance of the Reclamation settlement program was recognized by the Congress through increased appropriations in the First Deficiency Act that was passed at the beginning of the calendar year. The projects that will provide new farms for veterans were singled out by the Congress for exceptional increases in appropriations. The same action was taken by the Congress in the regular appropriation act that was passed in June. After extended testimony by Bureau representatives, the Appropriations Committee increased construction funds to provide settlement opportunities.

In keeping with the expanded settlement program, the Bureau is provided with increased facilities for the success of the new farmers. By Order 2195, Secretary Krug provided for increased participation by local communities in the selection of entrymen on public land. A program of land development and settler-assistance was approved by the Commissioner. This program includes testing and leveling the land, roughing in of irrigation facilities and the coordination of all available resources, both within the Bureau and those offered by other agencies. These and other measures bring the Bureau of Reclamation's settlement program to the fore throughout the United States as a practical, effective, and timely program for meeting the desires of qualified veterans to establish themselves on irrigated farms.

Public Land Openings

The cessation of hostilities early in the fiscal year brought a strong revival of interest in land settlement, particularly on the part of war veterans seeking a new start in civilian life. The Washington office alone received more than 3,500 inquiries concerning settlement opportunities during the year, while many thousands more were received by region and project offices.

To meet this demand, the Bureau expedited preparations for the opening of all suitable public lands in 1946 and construction and development work to open other public lands as soon thereafter as possible. Enlarged authority and responsibility in the selection of settlers was delegated to local examining boards. Boards to operate under this order were named on the Tule Lake division of the Klamath project in Oregon and California, the Roza division of the Yakima project in Washington, and the Heart Mountain division of the Shoshone project in Wyoming.

At the close of the year, farm unit layouts were practically completed and drafts of public notices were in preparation for land openings on the following projects during the first half of the 1947 fiscal year:

Project	Total irrigable farm	
	Acreage	Units
Klamath project, Tule Lake division	7,527	86
Yakima project, Roza division	1,722	28
Shoshone project, Heart Mountain division	7,720	83
Minidoka project, Gooding division	3,500	44
Owyhee project	150	3
Total	20,619	244

Crop Production

As new projects or divisions are completed and placed in operation this fact is reflected in annual summarizations of the irrigable acreage for which water is available, the acreages that were irrigated, and the crops produced. In 1945 the total irrigable area exceeded 5,000,000 acres for the first time. This figure includes all areas receiving supplemental and surplus project water under the provisions of the Warren Act, as well as special contractors. Gross crop values totaled $435,184,395, or $103.72 per acre, based on the total of 4,195,732 acres in cultivation. This gross value was accompanied by high operating costs, inadequate labor and other uncertain conditions that confronted the farmer and reduced his net profits. On the whole, however, the reclamation farmers enjoyed prosperity in 1945 and were able to pay their obligations to the United States. Aiding to meet the Nationwide demand for more food, reclamation projects were responsible for the production of 11,814,337 tons of food and forage crops in 1945.

Major Land Development Programs

During the fiscal year 1946 two great reclamation developments were initiated—one in the Missouri Basin in accordance with the congressional authorization of December 1944 and the other in the Columbia Basin in accordance with the 1943 act of Congress. Those projects will bring into production large new irrigation blocks and will create many thousand new farms for settlement by veterans. On each project a development staff has been established for the purpose of providing the necessary basic agricultural and economic information concerning soils, crops, markets, repayment ability, and related information, together with the needed demonstrations for practical adaptation of irrigation farming practices to the new areas. The Missouri Basin project development staff also has an important immediate job in the development of new repayment contracts needed before delivery of irrigation water.

War Relocation Authority Centers on Reclamation Projects

During the fiscal year arrangements were made for retransferring to the Bureau of Reclamation areas of public land in the Tule Lake division, Klamath project, California; Gooding division, Minidoka project, Idaho; and the Heart Mountain division, Shoshone project, Wyoming, which had been made available during the war period to the War Relocation Authority for use as relocation centers. Temporarily such lands previously farmed under the direction of the War Relocation Authority have been leased to individuals in order that the areas would not go out of production during 1946. At the expiration of these one-year leases the area will be subject to reclamation homestead entry. Arrangements were being made under an amendment to the Interior Department Appropriation Act for 1947, for the transfer of real and personal property of these three War Relocation centers to the Bureau of Reclamation.

Operation and Maintenance Objectives

Irrigation water was made available in the 1946 irrigation season for the first time to nine projects on which construction had been carried forward during the war years as a part of the national effort to increase production of much needed food supplies. Approximately 43,500 additional acres will be irrigated in 1946 as a result of Bureau activities on these projects, which are the Altus, Deschutes, Intake, Kendrick, Mirage Flats, Newton, Scofield, Rathdrum-Prairie, and Tucumcari. In addition, on the Roza division of the Yakima project approximately 8,500 acres of land are being irrigated in 1946 for the first time.

Commencement of Construction Charge Payments

During the fiscal year public notices were issued announcing the commencement of construction charge payments in 1946 for two completed projects (Owyhee and Vale) and a portion of the irrigable land in the Roza division of the Yakima project. A total of 143,806 irrigable acres come under these notices, and the aggregate initial annual assessments will amount to $325,296.

Amendatory and New Repayment Contracts

The accelerated postwar construction program now under way intensifies the Bureau's work on both new and amendatory repayment contracts. Building upon the experience of the past, a new approach is being taken in negotiating repayment contracts. Added emphasis is being given to the requirement of reimbursability of funds expended for irrigation development traditionally established by statute and policy. In addition, reimbursability is taking on new meaning with the increasing development of multiple-purpose projects embracing many features other than irrigation, such as hydroelectric power, flood control, navigation, fish and wildlife, protection and recreational activities. Problems related to land development are concerned with the reimbursability of those funds allocated to irrigation under which water users undertake to repay the Federal Treasury.

Determinations of the ability of water users to meet the reimbursable costs are an important consideration. The present program in this respect is designed to have a vital influence in the successful consummation of repayment contracts. Economic surveys, land classification, and farm management programs are included. The latter give special emphasis to the beneficial use of irrigation water to assure maximum crop production and permanent beneficial land use practices. Guidance for settlers is provided by the Bureau and cooperating Federal and State agencies.

Time is necessary before these activities can be made to function efficiently. Over a period of years they will have an important role in influencing the entire repayment program of the Bureau and should have far-reaching and beneficial results.

Deferment of construction installments was granted under existing law in the case of three projects during the year. These deferments, totaling $67,884.50, for the Milk River project, Montana; Westland irrigation district, Oregon; and the Northport irrigation district, North Platte project, Nebraska, were granted in view of peculiar difficulties affecting the repayment ability of the water users.

On October 18, 1945, the Secretary of the Interior executed the first of the Central Valley project water contracts. During the following months negotiations with approximately 12 additional irrigation districts have been prosecuted with a view to making available the full Friant-Kern supply throughout the San Joaquin Valley. The general form of contract utilized in these negotiations is for water service over a 40-year period at a rate that will not exceed a maximum of about $3.50 per acre foot. That type of contract is made necessary by the character of the project, involving among other things extensive water exchanges and other physical features that preclude the standard repayment arrangements. However, the excess land limitations and other requirements of law are fully incorporated in the Central Valley contract form. Where needed, separate 40-year contracts are to be provided to cover distribution systems.

Landownership Survey

The extent of excess land holdings on the Federal reclamation projects was made the subject of an intensive survey and study, initiated because of the great interest being shown in the matter and the misunderstanding in recent years both as to the policies which Congress has laid down with respect to acreage limitation on the lands served by reclamation projects and as to the actual administration of these policies in the settlement and development of reclamation projects.

The survey showed that on projects now receiving water, the farms are preponderantly family-size farms. Ninety-seven percent of these farms, containing 70 percent of the total irrigable acreage, are 160 acres or less in size, and 84 percent of the acreage is in farms not exceeding 320 acres. Only eight-tenths of 1 percent of the ownerships on projects receiving water in 1946 contain excess land which appears to be in violation of acreage limitations under Reclamation law. These ownerships contain only 3.8 percent of the entire irrigable area surveyed on the projects.

Canal Lining Program

During the fiscal year a program of research and testing of lower-cost canal linings was undertaken jointly by the Branches of Design and Construction, Operation and Maintenance, and the Regional Directors, for use in connection with the large construction program now under way and the needed rehabilitation of operating projects. The program will include an investigation of all types of canal linings now in existence, installation of measuring devices, and field studies to obtain accurate data on seepage losses.

Rehabilitation of Operating Irrigation Projects

The war years and the economic depression were periods when the irrigation facilities of operating projects received little attention. Scarcity of labor, materials, and supplies made it almost impossible for the water users to maintain the irrigation works in first-class operating condition. During the latter part of calendar year 1945, preliminary survey was made by the Bureau which revealed the possible need for extensive expenditures to repair, replace and restore various features on these operating projects.

During the first part of fiscal year 1947, it is expected to complete the detailed survey of each operating project which was completed and placed in operation prior to January 1, 1942. The results of the survey will determine the amount of rehabilitation work needed to restore the dams, canals, laterals, structures, and other complementary works.

TABLE 2.—*Settlement and economic data, 1945*

REGULAR PROJECTS

State	Project	Irrigated farms		Towns on or tributary to the project		Number of schools	Number of churches	Banks			Special Warren Act contractors	
		Number	Population	Number	Population			Number	Deposits	Number of depositors	Irrigated farms [1]	Population
Arizona	Salt River	13,087	41,800	9	191,300	98	165	8	$176,973,926	95,000	951	5,619
	Gila (Mesa division)	12	60	0	0	0	0	0	0	0	------	------
Arizona-California	Yuma	1,741	2,877	5	14,390	14	35	3	(2)	(2)	------	------
California	Orland	667	1,952	1	1,600	5	12	1	4,200,000	3,309	------	------
Colorado	Grand Valley [3]	520	1,427	6	25,700	17	40	3	21,297,868	14,000	807	1,830
	Uncompahgre	1,885	4,863	3	8,700	28	35	4	12,692,863	7,200	172	288
Idaho	Boise	4,236	15.250	16	55,895	118	131	6	216,121,865	(2)	4,764	19,516
	Minidoka	3,508	11,161	10	15,496	32	73	6	(2)	(2)	9,708	44,065
Montana	Bitter Root	326	1,061	5	4,532	15	13	4	7,457,264	5,290	------	------
	Frenchtown	43	185	1	100	1	1	0	0	0	------	------
	Huntley	647	1,268	5	691	7	6	1	554,705	503	------	------
	Milk River	722	2,574	15	11,778	29	38	7	18.820,313	10,499	------	------
	Sun River	1,014	2,550	5	900	10	15	1	(2)	(2)	------	------
Montana-North Dakota	Lower Yellowstone	648	2,210	7	4,620	17	22	3	7,408,555	4,592	------	------
Nebraska-Wyoming	North Platte	2,613	7,552	16	28,239	72	72	11	28,099,953	(2)	1,099	5,989
Nevada	Newlands	805	2,584	4	3,500	16	12	1	3,806,000	2,974	------	------
New Mexico	Carlsbad	457	2,100	4	20,900	14	20	2	9,000,000	8,000	------	------
New Mexico-Texas	Rio Grande	6,498	33,060	40	155,908	84	153	6	147,114,998	63,313	181	1,810
Oregon	Umatilla (east and west divisions)	400	1,260	5	3,227	7	16	1	3,220,308	2,914	37	71
	Vale	518	1,847	4	1,300	8	14	1	3,010,000	2,000	------	------
Oregon-California	Klamath	991	2,938	5	33,865	30	35	4	(2)	(2)	560	1,680
Oregon-Idaho	Owyhee	1,564	7,160	8	19,850	28	25	8	(2)	(2)	235	705
South Dakota	Belle Fourche	591	1,616	5	3,788	25	23	3	8,038,529	6,006	------	------
Utah	Strawberry Valley	1,961	6,500	6	15,242	22	21	4	11,186,414	14,517	------	------
Washington	Okanogan	393	1,074	3	5,000	8	8	2	7,480,332	4,300	------	------
	Yakima	5,473	20,237	24	59,221	51	91	9	28,037,094	19,102	4,590	17,162
Wyoming	Riverton	500	1,330	3	3,165	4	19	1	2,966,055	2,800	2	9
	Shoshone	1,028	1,917	6	6,765	3	15	1	3,089,609	2,091	------	------
	Total	52,848	180,413	221	695,672	763	1,110	101	720,576,651	268,410	23,106	98,744

SUPPLEMENTAL STORAGE PROJECTS

California	All-American Canal: Imperial Valley	4, 511	28, 000	8	42, 000	63	26	7	(2)	(2)		
Colorado	Fruitgrowers Dam	88	352	1	300	2	2	0	0	0		
	Pine River	293	745	5	1, 007	20	12	1	$542, 099	500		
Idaho	Minidoka (Fremont-Madison irrigation district).	1, 198	4, 840	14	9, 990	23	33	4	8, 236, 452	8, 634		
Nevada	Humboldt	138	204	1	1, 200	3	4	1	(2)	(2)		
	Truckee River Storage	1, 270	2, 700	2	32, 000	21	21	3	33, 000, 000	22, 500		
Oregon	Baker	40	146	1	8	4	0	0	0	0		
	Burnt River	118	925	8	2, 500	8	4	1	510, 000	(2)		
	Deschutes (Central Oregon irrigation district).	755	2, 175	6	15, 400	23	32	4	6, 600, 000	5, 700		
	Stanfield	160	491	1	563	2	2	0	0	0		
	Westland	98	201	0	0	0	0	0	0	0		
Utah	Hyrum	579	2, 895	3	3, 900	5	6	0	0	0		
	Moon Lake	654	3, 400	11	4, 500	9	17	1	2, 292, 915	3, 439		
	Ogden River	1, 100	4, 300	8	80, 000	34	60	4	40, 000, 000	36, 000		
	Provo River (Deer Creek division)	1, 260	3, 000	7	58, 425	24	47	6	22, 378 074	20, 420		
	Sanpete	223	697	2	2, 792	5	4	1	1, 715, 000	(2)		
	Weber River	3, 000	15, 000	21	27, 000	31	26	8	50, 000, 000	40, 000		
	Total	15, 485	70, 071	99	281, 585	277	296	41	165, 274, 540	137, 193		

WATER CONSERVATION AND UTILIZATION PROJECTS

Montana	Buffalo Rapids:											
	First division	131	350	2	1, 300	6	14	3	$6, 400, 000	4, 800		
	Second division	52	156			4	9	1	2, 263, 795	1, 150		
North Dakota	Buford-Trenton	40	120									
	Total	223	626	2	1, 300	10	23	4	8, 663, 795	5, 950		
	Grand total	68, 556	251, 110	322	978, 557	1, 050	1, 429	146	894, 514, 986	411, 553	23, 106	98, 744

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[1] Farms furnished partial or whole water supply under Warren Act or other special contracts.
[2] Data not reported.
[3] Gravity division only; does not include Orchard Mesa irrigation district.

TABLE 3.—*Cumulative crop values, 1906–45*

Year	Federal irrigation projects [1]				Warren Act lands and special contractors				Entire area			
	Irrigated acreage	Net area in cultivation	Total crop value		Irrigated acreage	Net area in cultivation	Total crop value		Irrigated acreage	Net area in cultivation	Total crop value	
			For year	Cumulative total			For year	Cumulative total			For year	Cumulative total
1906	22,300	[2] 20,100	$244,900						22,300	[2] 20,100	$244,900	
1907	187,628	[2] 169,000	4,760,460	$5,005,360					187,628	[2] 169,000	4,760,460	$5,005,360
1908	289,549	[2] 260,500	7,635,888	12,641,248					289,549	[2] 260,500	7,635,888	12,641,248
1909	410,628	[2] 369,500	11,920,663	24,561,911					410,628	[2] 369,500	11,920,663	24,561,911
1910	471,423	413,000	12,944,639	37,506,550					471,423	413,000	12,944,639	37,506,550
1911	562,311	470,100	13,086,441	50,592,991					562,311	470,100	13,086,441	50,592,991
1912	614,477	540,000	16,007,134	66,600,125					614,477	540,000	16,007,134	66,600,125
1913	694,142	637,227	15,676,409	82,276,534					694,142	637,227	15,676,409	82,276,534
1914	761,271	703,424	16,475,517	98,752,051					761,271	703,424	16,475,517	98,752,051
1915	810,649	760,035	18,164,452	116,916,503					810,649	760,035	18,164,452	116,916,503
1916	922,821	858,291	32,815,972	149,732,475					922,821	858,291	32,815,972	149,732,475
1917	1,026,663	966,784	56,462,313	206,194,788					1,026,663	966,784	56,462,313	206,194,788
1918	1,119,566	1,051,193	66,821,396	273,016,184	[2] 501,100	[2] 481,600	$35,000,000		[2] 1,620,666	1,532,793	101,821,396	308,016,184
1919	1,187,255	1,113,469	88,974,137	361,990,321	916,313	880,613	64,368,468	$99,368,468	2,103,568	1,994,082	153,342,605	461,358,789
1920	1,223,480	1,153,820	66,171,650	428,161,971	981,940	950,890	47,836,750	147,205,218	2,205,420	2,104,710	114,008,400	575,367,189
1921	1,227,500	1,157,900	49,620,300	477,782,271	1,001,250	969,550	45,288,630	192,493,848	2,228,750	2,127,450	94,908,930	670,276,119
1922	1,202,130	1,169,100	50,360,850	528,143,121	983,290	951,270	33,240,840	225,734,688	2,185,420	2,120,370	83,601,690	753,877,809
1923	1,213,700	1,179,870	65,046,300	593,189,421	1,051,380	993,040	37,557,860	263,292,548	2,265,080	2,172,910	102,604,160	856,481,969
1924	1,290,890	1,216,610	66,488,560	659,677,981	930,670	889,460	43,237,470	306,530,018	2,221,560	2,106,070	109,726,030	966,207,999
1925	1,320,300	1,242,750	77,608,880	737,286,861	1,019,170	951,250	53,655,850	360,185,868	2,339,470	2,194,000	131,264,730	1,097,472,729
1926	1,411,020	1,328,810	60,369,620	797,656,481	1,097,190	949,590	49,750,040	409,935,908	2,508,210	2,278,400	110,119,660	1,207,592,389
1927	1,378,990	1,326,810	70,985,450	868,641,931	1,148,115	1,072,486	61,160,010	471,095,918	2,527,105	2,399,296	132,145,460	1,339,737,849
1928	1,442,080	1,385,560	80,238,800	948,880,731	1,235,020	1,192,030	62,495,320	533,591,238	2,677,100	2,577,590	142,734,120	1,482,471,969
1929	1,483,900	1,420,070	87,559,670	1,036,440,401	1,234,230	1,192,990	72,720,490	606,311,728	2,718,130	2,613,060	160,280,160	1,642,752,129
1930	1,504,810	1,467,097	64,418,940	1,100,859,341	1,286,046	1,254,493	54,654,550	660,966,278	2,790,856	2,721,590	119,073,490	1,761,825,619
1931	1,522,718	1,462,565	40,121,089	1,140,980,430	1,293,889	1,251,830	33,406,340	694,372,618	2,816,607	2,714,395	73,527,429	1,835,353,048
1932	1,555,144	1,506,320	31,165,752	1,172,146,182	1,214,461	1,196,400	18,627,219	712,999,837	2,769,605	2,702,720	49,792,971	1,885,146,019
1933	1,589,770	1,529,903	48,138,576	1,220,284,758	1,239,017	1,199,113	35,425,870	748,425,707	2,828,787	2,729,016	83,564,446	1,968,710,465
1934	1,552,124	1,464,405	59,628,327	1,279,913,085	1,285,081	1,229,594	40,160,676	788,586,383	2,837,205	2,693,999	99,789,003	2,068,499,468
1935	1,640,936	1,604,166	63,601,663	1,343,514,748	1,294,680	1,256,970	43,179,631	831,766,014	2,935,616	2,861,136	106,781,294	2,175,280,762
1936	1,702,192	1,629,174	78,902,818	1,422,417,566	1,335,995	1,272,745	57,599,662	889,365,676	3,038,187	2,901,919	136,502,480	2,311,783,242
1937	1,725,463	1,700,969	72,893,649	1,495,311,215	1,389,338	1,333,800	45,764,623	935,130,299	3,114,801	3,034,769	118,658,272	2,430,441,514
1938	1,777,584	1,764,363	67,859,804	1,563,171,019	1,329,115	1,276,332	45,603,656	980,733,955	3,106,699	3,040,695	113,463,460	2,543,904,974
1939	1,922,868	1,903,269	73,769,654	1,636,940,673	1,218,108	1,174,803	40,313,140	1,021,047,095	3,140,976	3,078,072	114,082,794	2,657,987,768

1940	2, 152. 808	2. 138, 927	80, 098, 196	1, 717, 038. 869	1, 238, 262	1, 177, 103	37, 690, 481	1, 058, 737, 576	3, 391, 070	3, 316, 030	117, 788, 677	2, 775, 776, 445
1941	2, 199. 179	2, 178, 288	110, 399, 806	1, 827, 438. 675	1, 140. 204	1, 202, 172	49. 386, 191	1, 108, 223, 767	3, 339, 383	3, 380, 460	159, 885, 997	2, 935, 662, 442
1942	2, 277, 955	2, 259, 653	155, 619, 716	1, 983, 058, 391	1, 602. 907	1, 562, 046	116, 423, 800	1, 224, 652, 567	3, 880. 862	3, 821, 699	272, 048. 516	3, 207, 710, 958
1943	2, 422, 288	2, 398, 922	218, 064, 208	2, 201, 122, 599	1, 633, 041	1, 615, 424	170, 606, 761	1, 395, 259, 328	4, 055, 329	4, 014, 346	388, 670, 969	3, 596, 381, 927
1944	2, 468. 842	2, 475, 280	224, 683, 280	2, 425, 805, 879	1, 694, 881	1, 664, 069	186, 543, 084	1, 581, 802, 412	4, 163, 703	4, 139, 349	411, 226, 364	4, 007, 608, 291
1945	2, 416, 961	2, 464, 672	232, 545, 321	2, 658, 351, 200	1, 745, 627	1, 731, 060	202, 639, 074	1, 784, 441, 436	4, 162, 583	4, 195, 732	435, 184, 395	4, 442, 792, 686

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[1] Includes projects constructed by the United States and those for which supplemental water is furnished from storage works built by the United States.

[2] Estimated.

TABLE 4.—*Projects in operation—Irrigation and crop value data for the calendar year 1945*

State, project, and subdivision	Projects entirely constructed by the Bureau							Projects furnished supplemental storage water from works constructed by the Bureau					Special and Warren Act contractors receiving water from Bureau constructed works				
	Irrigable area [1]	Irrigated area	Land subject to construction charges			Temporarily suspended lands [2]		Irrigable area [1]	Irrigated area	Net area in cultivation	Crop values		Irrigable area	Irrigated area	Net area in cultivation	Crop values	
			Net area in cultivation	Crop values		Net area in cultivation	Total crop values				Total	Per acre				Total	Per acre
				Total	Per acre												
ARIZONA	*Acres*	*Acres*	*Acres*			*Acres*		*Acres*	*Acres*	*Acres*			*Acres*	*Acres*	*Acres*		
Salt River	243, 125	214, 346	228, 533	$33, 034, 154	$144. 55	0	0						99, 807	81, 736	78, 944	$8, 377, 548	$106. 12
Gila-Yuma Mesa division	4, 262	3, 688	5, 673	177, 578	31. 30	0	0										
ARIZONA-CALIFORNIA																	
Yuma:																	
Valley division, Arizona	50, 390	45, 359	44, 763	6, 811, 119	152. 16	671	$10, 541										
Reservation division, California	7, 743	2, 748	2, 748	156, 249	56. 86	0	0										
Bard division, California	6, 882	5, 400	5, 392	368, 675	68. 37	80	808										
Yuma Auxiliary (Mesa), Arizona	4, 025	1, 619	1, 619	1, 059, 111	654. 18	0	0										
Total—Yuma project	69, 040	55, 126	54, 522	8, 395, 154	153. 98	751	11, 349										
CALIFORNIA																	
All - American Canal:																	
Imperial irrigation district													523, 000	393, 786	393, 786	62, 298, 113	158. 20
Central Valley [3]													164, 897	95, 482	95, 482	18, 302, 432	191. 68
Orland	20, 147	16, 614	16, 614	1, 558, 785	93. 82	0	0										

COLORADO																	
Fruitgrowers Dam								2, 662	2, 022	2, 022	$249, 779	$123. 53					
Grand Valley:																	
Gravity division	30, 444	20, 124	20, 124	1, 306, 445	64. 92	0	0										
Orchard Mesa irrigation district [4]	10, 027	8, 123	8, 123	2, 112, 388	260. 05	0	0										
Total—Grand Valley project	40, 471	28, 247	28, 247	3, 418, 833	121. 03	0	0						8, 400	7, 470	7, 470	1, 968, 323	263. 50
Pine River								35, 933	25, 452	25, 452	626, 840	24. 63					
Uncompahgre	93, 885	63, 184	62, 044	2, 892, 816	46. 63	1, 140	40, 036						6, 288	5, 060	5. 060	263, 581	52. 09
IDAHO																	
Boise:																	
Big Bend irrigation district	1, 696	1, 416	1, 417	85, 865	60. 60	0	0										
Black Canyon irrigation district (Notus)	6, 883	6, 116	6, 116	791, 864	129. 47	0	0										
Black Canyon irrigation district (Payette)	27, 760	19, 496	19, 684	1, 020, 867	51. 86	0	0										
Boise-Kuna irrigation district	48, 546	44, 607	44, 588	3, 412, 487	76. 53	19	285										
Nampa-Meridian irrigation district	40, 083	34, 893	35, 047	2, 533, 191	72. 28	46	0										
New York irrigation district	17, 382	15, 053	15, 298	624, 913	40. 85	0	0										
Settlers irrigation district	518																
Wilder irrigation district	56, 492	49, 985	49, 022	5, 960, 773	121. 59	1, 030	12, 857										
Total—Boise project	199, 360	171, 566	171, 172	14, 429, 960	84. 30	1, 095	13, 142						125, 303	116, 328	116, 328	8, 644, 557	74. 31
Minidoka:																	
Minidoka irrigation project	71, 846	62, 141	61, 487	4, 655, 767	75. 72	654	0										
Burley irrigation district	47, 937	44, 293	44, 293	3, 811, 573	86. 05	0	0										
American Falls Reservoir district No. 2	92, 138	79, 130	79, 627	3, 674, 595	46. 15	0	0										
Fremont - Madison irrigation district								93, 682	85, 681	87, 678	5, 378, 854	61. 35					
Total — Minidoka project	211, 921	185, 564	185, 407	12, 141, 935	65. 49	654	0						707, 633	684, 753	684, 753	51, 732, 145	75. 55

See footnotes at end of table, p. 75.

TABLE 4.—*Projects in operation—Irrigation and crop value data for the calendar year 1945*—Continued

State, project, and subdivision	Projects entirely constructed by the Bureau							Projects furnished supplemental storage water from works constructed by the Bureau					Special and Warren Act contractors receiving water from Bureau constructed works				
	Irrigable area[1]	Irrigated area	Land subject to construction charges			Temporarily suspended lands [2]		Irrigable area [1]	Irrigated area	Net area in cultivation	Crop values		Irrigable area	Irrigated area	Net area in cultivation	Crop values	
			Net area in cultivation	Crop values		Net area in cultivation	Total crop values				Total	Per acre				Total	Per acre
				Total	Per acre												
MONTANA																	
	Acres	*Acres*	*Acres*			*Acres*		*Acres*	*Acres*	*Acres*			*Acres*	*Acres*	*Acres*		
Bitter Root [4]	16,553	16,392	16,553	$686,955	$41.50	0	0										
Buffalo Rapids:																	
First division	13,109	12,630	12,787	579,906	45.35	0	0										
Second division	8,100	4,886	4,886	60,979	12.48	0	0										
Total — Buffalo Rapids project [5]	21,209	17,516	17,673	640,885	36.26	0	0										
Frenchtown	4,878	2,195	2,807	131,740	46.93	0	0										
Huntley	29,590	24,195	17,012	1,020,931	60.01	7,426	$190,219										
Milk River:																	
Malta division	56,652	23,999	14,658	645,927	44.07	9,742	123.053										
Glasgow division	21,997	6,745	8,184	317,222	38.76	205	4,573										
Chinook division	43,484	25,801	26,792	1,370,982	51.17	0	0										
Pump lands	3,848	3,848	3,847	317,192	82.45	0	0										
Total—Milk River project	125,981	60,393	53,481	2,651,323	49.58	9,947	127,626										
Sun River:																	
Fort Shaw division	13,902	7,682	8,301	183,934	22.16	188	3,396										
Greenfields division	82,963	68,457	72,184	1,560,487	21.62	0	0										
Total—Sun River project	96,865	76,139	80,485	1,744,421	21.67	188	3,396										

MONTANA-NORTH DAKOTA															
Lower Yellowstone:															
District No. 1, Montana	36, 977	32, 304	31, 496	1, 897, 818	60. 26	808	32, 509	--------	--------	--------	--------	--------	--------	--------	--------	--------
District No. 2, North Dakota	19, 689	15, 787	15, 419	782, 502	50. 75	368	16, 922	--------	--------	--------	--------	--------	--------	--------	--------	--------
Total—Lower Yellowstone project	56, 666	48, 091	46, 915	2, 680, 320	57. 13	1, 176	49, 431	--------	--------	--------	--------	--------	--------	--------	--------	--------
NEBRASKA-WYOMING															
North Platte:															
Pathfinder irrigation district	112, 943	86, 043	74, 650	4, 335, 681	58. 08	11, 393	208, 840	--------	--------	--------	--------	--------	--------	--------	--------	--------
Gering & Fort Laramie irrigation district	54, 845	51, 994	50, 579	3, 134, 029	61. 96	1, 415	22, 647	--------	--------	--------	--------	--------	--------	--------	--------	--------
Goshen irrigation district, Wyoming	52, 486	45, 698	42, 708	2, 556, 413	59. 86	2, 990	21, 740	--------	--------	--------	--------	--------	--------	--------	--------	--------
Northport irrigation district	16, 170	9, 608	8, 564	261, 388	30. 52	1, 044	11, 014	--------	--------	--------	--------	--------	--------	--------	--------	--------
Total — North Platte project	236, 444	193, 343	176, 501	10, 287, 511	58. 29	16, 842	264, 241	--------	--------	--------	--------	--------	108, 715	100, 414	97, 200	$5, 673, 441	$58. 37
NEVADA															
Humboldt	--------	--------	--------	--------	--------	--------	--------	37, 046	17, 928	17, 928	1, 034, 666	$57. 71	--------	--------	--------	--------	--------
Newlands	67, 469	57, 662	57, 682	2, 290, 767	39. 71	1, 190	11, 917	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------
Truckee River storage	--------	--------	--------	--------	--------	--------	--------	29, 376	(No report received)			--------	--------	--------	--------	--------	--------
NEW MEXICO															
Carlsbad	25, 055	20, 715	20, 715	1, 539, 967	74. 34	0	0	--------	--------	--------	--------	--------	--------	--------	--------	--------
NEW MEXICO-TEXAS															
Rio Grande:															
Elephant Butte irrigation district, New Mexico	88, 000	88, 714	85, 256	11, 692, 644	137. 15	3, 754	309, 580	--------	--------	--------	--------	--------	--------	--------	--------	--------
El Paso County water improvement district No. 1, Texas	67, 000	65, 747	63, 125	10, 142, 062	160. 67	2, 727	245, 688	--------	--------	--------	--------	--------	--------	--------	--------	--------
Total—Rio Grande project	155, 000	154, 461	148, 381	21, 834, 706	147. 15	6, 481	555, 268	--------	--------	--------	--------	--------	17, 793	15, 220	15, 220	2, 0, 75696	135. 14

See footnotes at end of table, p. 75.

TABLE 4.—*Projects in operation—Irrigation and crop value data for the calendar year 1945*—Continued

State, project, and subdivision	Projects entirely constructed by the Bureau							Projects furnished supplemental storage water from works constructed by the Bureau					Special and Warren Act contractors receiving water from Bureau-constructed works				
	Irrigable area [1]	Irrigated area	Land subject to construction charges			Temporarily suspended lands [2]		Irrigable area [1]	Irrigated area	Net area in cultivation	Crop values		Irrigable area	Irrigated area	Net area in cultivation	Crop values	
			Net area in cultivation	Crop values		Net area in cultivation	Total crop values				Total	Per acre				Total	Per acre
				Total	Per acre												
NORTH DAKOTA																	
	Acres	*Acres*	*Acres*			*Acres*		*Acres*	*Acres*	*Acres*			*Acres*	*Acres*	*Acres*		
Buford-Trenton [5]	10, 985	8, 776	8, 77	177, 783	$20. 26	0	0										
OREGON																	
Baker								7, 312	7, 312	7, 312	$209, 206	$28. 61					
Burnt River								15, 291	15, 291	15, 291	385, 719	25. 23					
Deschutes—Central Oregon irrigation district								42, 382	38, 388	38. 388	3, 094, 854	80. 62					
Stanfield								6, 000	4, 998	4, 998	177, 008	35. 42					
Umatilla:																	
East division	10, 911	6, 693	6, 693	322, 250	48. 15	0	0										
West division	7, 620	4, 792	5, 009	164. 735	32. 89	0	0										
Total—Umatilla project	18, 531	11, 485	11, 702	486, 985	41. 62	0	0						1, 003	828	909	$90, 168	$99. 19
Vale	32, 000	31, 145	31, 145	2, 371, 300	76. 14	0	0										
Westland								8, 052	3, 963	3, 963	136, 914	34. 55					
OREGON-CALIFORNIA																	
Klamath:																	
Main division, Oregon	41, 081	31, 901	31, 527	4, 233, 185	134. 27	915	$38, 117										
Tule Lake division, California	25, 569	24, 338	24, 498	4, 590, 689	187. 39	0	0										
Total—Klamath project	66, 650	56, 239	56, 025	8, 823, 874	157. 50	915	38, 117						79, 867	63, 081	63, 081	5, 625, 844	89. 18

OREGON-IDAHO																	
Owyhee:																	
Advancement irrigation district	701	625	640	46, 145	72. 10	0	0										
Bench irrigation district	2, 310	2, 241	2, 241	380, 338	169. 72	0	0										
Crystal irrigation district	1, 264	1, 166	1, 166	285, 480	244. 84	0	0										
Owyhee irrigation district	55, 375	49, 012	49, 725	4, 505, 841	90. 62	0	0										
Payette-Oregon Slope irrigation district	4, 601	4, 197	4, 202	875, 523	208. 36	0	0										
Ontario-Nyssa irrigation district	5, 920	5, 592	5, 622	662, 449	117. 83	0	0										
Gem irrigation district, Idaho	30, 213	28, 826	28, 733	2, 571, 491	89. 50	776	44, 054										
Slide irrigation district	1, 092	1, 067	1, 068	130, 075	121. 79	0	0										
Total—Owyhee project	101, 476	92, 726	93, 397	9, 457, 342	101. 26	776	44, 054						13, 800	13, 130	13, 130	1, 617, 259	123. 17
SOUTH DAKOTA																	
Belle Fourche	72, 431	42, 435	51, 340	1, 409, 945	27. 46	565	0										
UTAH																	
Lyrum								6, 261	5, 717	5, 779	289, 767	50. 14					
Moon Lake								72, 608	56, 255	56, 255	779, 372	13. 85					
Ogden River								21, 713	15, 458	15, 458	1, 292, 227	83. 60					
Provo River—Deer Creek division								38, 927	27, 163	27, 899	4, 276, 065	153. 27					
Sanpete:																	
Ephraim division								6, 700	5, 458	5, 704	165, 788	29. 07					
Spring City division								6, 017	4, 382	4, 532	115, 176	25. 41					
Total—Sanpete project								12, 717	9, 840	10, 236	280, 964	27. 45					
Strawberry Valley:																	
Highline division	18, 404	16, 263	16, 953	911, 681	53. 78	0	0										
Spanish Fork division	13, 725	12, 789	13, 060	871, 331	66. 72	0	0										
Springville-Mapleton division	8, 867	8, 120	8, 368	835, 711	99. 87	0	0										
Total—Strawberry Valley project	40, 996	37, 172	38, 381	2, 618, 723	68. 23	0	0						7, 659	7, 136	7, 287	477, 636	65. 55
Weber River: Salt Lake Basin								91, 374	89, 478	90. 118	13,797,750	153. 11					

See footnotes at end of table, p. 75.

TABLE 4.—*Project in operation—Irrigation and crop valve data for the calender year 1945*—Continued

State, project, and subdivision	Projects entirely constructed by the Bureau						Projects furnished supplemental storage water from works constructed by the Bureau					Special and Warren Act contractors receiving water from Bureau constructed works				
	Irrigable area[1]	Irrigated area	Land subject to construction charges			Temporarily suspended lands[2]		Irrigable area[1]	Irrigated area	Net area in cultivation	Crop values		Irrigable area	Irrigated area	Net area in cultivation	Crop values	
			Net area in cultivation	Crop values		Net area in cultivation	Total crop values				Total	Per acre				Total	Per acre
				Total	Per acre												
WASHINGTON	*Acres*	*Acres*	*Acres*			*Acres*		*Acres*	*Acres*	*Acres*			*Acres*	*Acres*	*Acres*		
Okanogan	5,333	3,961	3,961	$2,436,849	$615.21	0	0										
Yakima:																	
Sunnyside division	103,579	81,354	83,465	14,829,247	177.67	468	16,962										
Tieton division	27,588	24,679	24,576	20,979,434	853.66	0	0										
Kittitas division	69,552	54,194	54,479	2,883,405	52.93	97	776										
Roza division	40,446	18,555	18,445	3,736,816	202.59	99	19,462										
Total—Yakima project	241,165	178,782	180,965	42,428,902	234.46	664	37,200						190,195	160,817	152,024	$35,494,381	$233.48
WYOMING																	
Riverton	42,500	38,641	38,760	1,467,086	37.85	0	0						386	386	386	16,850	43.65
Shoshone:																	
Garland division	41.627	34,144	33,296	1,608,642	48.31	848	13,377										
Frannie division	19,951	10,931	10,000	323,943	32.39	931	16,197										
Willwood division	11,542	10,275	10,206	456,916	44.77	69	0										
Heart Mountain division	13,938																
Total—Shoshone project	87,058	55,350	53,502	2,389,501	44.66	1,848	29,574										
Total	2,437,046	1,966,149	1,958,371	195,627,031	99.89	51,658	1,415,570	521,336	404,946	408,777	$32,006,985	$78.31	2,054,746	1,745.627	1,731,060	202,639,074	117.06
Total—regular projects	2,437,046	1,966,149	1,958,371	195,627,031	99.89												
Total—storage projects	521,336	404,946	408,777	32,009,985	78.31												
Total—special and Warren Act lands	2,054,746	1,745,627	1,731,060	202,639,074	117.06												

Additional areas reported:																	
Temporarily suspended	--------	--------	51,658	1,415,570	27.40	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------
Leased areas, WRA Center, etc	--------	45,866	45,866	3,492,735	76.15	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------
Total	5,013,128	4,162,588	4,195,732	435,184,395	103.72	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------
Additional irrigable lands, no crop details reported [6]	17,208	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------
Grand total, 1945	5,030,336	4,162,588	4,195,732	435,184,395	103.72	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------
Grand total, 1944	4,885,251	4,163,703	4,139,349	411,226,364	99.27	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------
Increase, 1944–45, total	145,085	−1,115	56,383	23,958,031	4.45	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

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[1] Area for which Bureau is prepared to supply water.

[2] Generally part of irrigable area but not subject to construction charges until reclaimed.

[3] Estimated figures in this report cover lands receiving water by operation of Shasta and Friant Dams under interim contracts. Additional lands in the Sacramento and San Joaquin Valleys received indirect benefits during 1945.

[4] Private projects reconstructed with Government funds.

[5] Water conservation and utilization projects.

[6] North and South Gila Valleys (Gila project), Arnold and Lone Pine irrigation districts (Deschutes project).

NOTE.—Per acre value based on net area in cultivation.

Planning Horizons

Comprehensive investigations of irrigation and multiple-purpose projects in the major river basins of the West were rapidly advanced or completed during the fiscal year with regular and supplemental appropriations for planning investigations greater than ever previously available.

Although regular appropriations made before cessation of hostilities were small, supplemental appropriations were quickly made available by the Congress after the fall of Japan.

Comprehensive surveys of 25 major river basins and some 200 investigations of sub-basins and projects were in progress during the year. Six basin and project reports comprising Santa Barbara County, Calif.,[1] Lewistown Orchards, Idaho, Payette Unit of Mountain Home, Idaho,[1] Paonia, Colo., projects and Central Valley, Calif.,[2] and Colorado River Basin comprehensive reports, were completed. Hearings on authorization of construction and development of the Lewistown Orchards project were in progress before the Senate Committee on Irrigation and Reclamation at the end of the year.

Stepped-up progress on investigations of other basins and projects has enabled scheduling many of them for field completion during the next fiscal year.

Increased emphasis was given to the development of new techniques in studies of meteorology, hydrology, and in the investigations of sedimentation. Assistance was given to regional and project offices in making investigations of land classifications, land use, farm organization, industrial resources, benefits, costs, and other economic phases of project planning.

Basic information on the historical trends of farm commodity prices was assembled and conferences held with commodity specialists of the United States Department of Agriculture to develop the farm price outlook. These data and opinions are being used to determine the agricultural commodity price levels to be used in planning irrigation projects.

Some 35 reports covering flood control and river and harbor improvements submitted to the Secretary of the Interior by the Corps of Engineers of the War Department in accordance with the Flood Control Act of 1944 were reviewed and commented on during the year. The Branch of Project Planning and other offices in the Bureau and in the Department review such reports with particular attention to their relation to water supplies for irrigation, power, municipal purposes, and other multiple uses.

To bring about greater uniformity in practices among the Federal agencies concerned with development of water resources, personnel in the

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[1] Some revisions of these reports may be required in the light of comments received from the Bureau of the Budget.

[2] This report requires further consideration, which it is not actively receiving, in the light of comments by the State of California and by the Secretary of War.

Branch of Project Planning represent the Bureau on the Federal Inter-Agency River Basin Committee's subcommittees on benefits and costs, correlation of hydrologic data, sedimentation, and on preparation of statement of differences between the Interior and War Department reports on the Central Valley of California.

In attempting to expand Planning activities in the field to a degree commensurate with the increase in investigation funds, considerable difficulty was encountered in obtaining sufficient qualified personnel and essential equipment, particularly transportation equipment. Although during the latter half of the fiscal year, release of men from the armed services alleviated the general situation appreciably and the equipment problem was being slowly solved, lack of housing for personnel continued to handicap the planning program. In the face of these difficulties, some of the funds appropriated for planning in fiscal year 1946 were carried over into fiscal year 1947.

Power for the West

A major element in the Bureau of Reclamation postwar plan for the development of the West is the program for the development of additional sources of electric power and the construction of the transmission lines required to bring such power to market. The inevitable result of this vast development program will be the creation of new communities, both agricultural and industrial. One of the major factors influencing the shaping of the social structure of such modern communities is low cost electric power. The utilization of the potential power made available through the harnessing of rivers by means of multiple-purpose projects is of necessity an integral part of the postwar program. Moreover, the sale of this power benefits the project areas in two important respects. First, it makes available in an impartial manner with preference to public agencies and municipalities low cost electric energy, without which the development of the project areas would be impeded. Secondly, the revenues from the sale of such power repays to the Federal treasury the major part of the cost of the project and thereby greatly assists the project in meeting the payout requirements set forth in the Reclamation law.

With the above factors in mind, the Bureau of Reclamation is developing its program to meet the power requirements with the most suitable and efficient power systems that are possible to obtain. The year ended June 30, 1946, found an auspicious start made in the actual construction of these power systems.

The power development proposed by the Bureau offers the solution to two basic problems facing the States of the West. It will provide adequate quantities of low cost power for the development of new industries in these States; industries which will utilize the heretofore untapped vast store of mineral resources as well as the related agricultural products in this section of the country. Lack of sufficient electric power has been a principal handicap to earlier development. The program will also provide a stimulus to the agricultural development of these States by making low-cost power available for pumping water to irrigate thousands of acres of arid land. Already the exigencies of the war has resulted in developments along these lines and has created a market for additional electric power in those areas.

During the war the Bureau's power facilities were overloaded even though a spectacular expansion was made to meet the power requirements of the industries. Now, almost a year after the cessation of hostilities, this overloading continues and it is clear that several areas in the Western States which received large quantities of power for war work from Bureau power plants will require even more power for vastly expanded peacetime industrial developments stimulated by wartime developments and increased domestic usage resulting from the large population increases. The continued growth and development of certain western areas will be hampered seriously unless additional power is made available. In some cases this condition is aggravated by the approaching obsolescence of fuel-burning power plants or the expected depletion of low cost fuel resources. The logical solution to this problem is the utilization of falling water, a recurring resource, as the source of power. The Bureau and other agencies are making power studies of various areas where critical power shortages have already occurred or will occur if additional generating capacity is not provided. The results of these studies will indicate the power developments whose construction must be accelerated in order to meet the energy requirements of those areas.

In the period between VJ-day and the end of the fiscal year, the Bureau was faced with serious shortages of manpower and of materials of almost every item required for power plant construction. In spite of these difficulties, substantial progress was made on the construction program. Exceptional progress has been made on the engineering and design phases of the program and the Bureau has prepared the foundation for an accelerated program for the forthcoming years.

Included in the Bureau's power development program is a proposed system of transmission lines connecting load centers with sources of power. The Bureau's policy to market power in wholesale quantities at transmission line voltages, giving preference to public agencies such as municipalities and cooperative groups can only be achieved by the construction of a well-planned transmission network. In order to accomplish this, it is necessary that the Government build these transmission lines to assure that the power will be available to such organizations at load centers at the lowest cost possible. In addition, a well coordinated system for delivering power continuously as cheaply as possible makes it imperative that a unified development of the central stations and transmission line facilities take place.

A significant start on the program of transmission line construction has also been made within the last year. Construction has started on several of the principal lines which will become important links in future systems. These systems will be rounded out to completion to coordinate the installation of generating equipment and transmission and substation facilities to coincide with the demands for additional power.

Another aspect of the Bureau's transmission line program is the construction of additional line facilities to supplement existing lines that are heavily overloaded. Construction of these lines was curtailed during the war years, but the areas which they served sustained a tremendous load growth during this period. The additional transmission lines are required to provide an adequate power supply to these areas.

The Bureau's plants which range in size from two of the largest in the world at Boulder Dam and Grand Coulee to some relatively small plants located on various irrigation projects are all producing to capacity. This past year saw no let-up in their service to the West; they continue to play their vital role in the development of that area. It is significant to note that the over-all trend of development of the Western States has to a very large degree followed the trend of the Bureau's activities in those States.

The postwar power program is one of great magnitude and its orderly development is of necessity scheduled over a period of years. Feasibility requirements are probably the determining factors governing the scheduling of the individual units of the whole program. Specifically, the present installed capacity of 2,439,300 kilowatts will reach a total of 4,389,700 kilowatts when installations in existing plants are completed. This total will be approximately 7,000,000 kilowatts of installed capacity upon completion of projects now under construction or authorized for construction by the Bureau of Reclamation and including authorized plants of other agencies for which the Bureau of Reclamation has been given the responsibility of marketing the power.

The fact is that a start has been made on this power program; this past year saw it gain its initial momentum. The preliminary work is well done and the way is paved for even greater progress toward its final realization in the forthcoming years. In the last analysis this power program is dedicated to the achievement of better living in the great area it is to serve. That cannot be realized until the goal of providing an abundance of low cost electric power to the widely diversified industrial and agricultural areas of the West is reached.

Design and Construction

To meet the demands of the stepped-up schedule, design work during the second half of the fiscal year reached a volume exceeding by several times that of any prewar period. A total of 845 contracts amounting to approximately $107,000,000 were awarded during the fiscal year. During the same period, 1,520 invitations to bid were issued on construction work and materials and operating equipment, amounting to $156,000,000.

At the end of the fiscal year, work on designs and specifications for authorized projects was in progress on 32 dams, 13 power plants, 52 pumping plants, and 43 major canal systems. In addition, preliminary designs and estimates were being prepared on engineering features for numerous other projects.

Construction was begun on such major works as Kortes Dam in Wyoming, first Bureau unit of the Missouri Basin project; the 160-mile Friant-Kern Canal on the Central Valley project in California; the vast irrigation system for the Columbia Basin project in Washington; and Davis Dam and power plant on the lower Colorado River. At the end of the fiscal year construction was in progress on 13 dams, 5 power plants, 19 pumping plants, and 185 miles of main canals.

The following dams were completed: Scofield and Newton Dams in Utah, Shadow Mountain Dam on the Colorado-Big Thompson project, and Box Butte Dam on the Mirage Flats project in Nebraska. Completed construction included one power plant, four pumping plants, 352 miles of transmission lines, and 87 miles of main canals, as well as the concrete lining of the 13-mile-long Alva B. Adams tunnel through the Continental Divide. First water on the Tucumcari project in New Mexico was delivered to landowners in November, quickly followed by first water delivery on the Altus project in Oklahoma, and on the Deschutes project in Oregon.

Effect of Reconversion

Construction materials and equipment shortages were reflected in the reluctance of some construction firms and manufacturers to bid on contracts involving the supply of materials. More bids than usual were rejected during the fiscal year as excessively high.

Uncertain labor supply and wages were also contributing factors to construction difficulties. However, the use of an escalator clause in many major contracts helped to alleviate the risk of labor uncertainties for construction contractors. This clause provides for increased payments to contractors in the event of approved increased wage rates. Labor supply was improved to a considerable degree in the latter part of the fiscal year by return of veterans to civilian work. Work stoppages of comparatively minor importance occurred on some projects.

With the active resumption of Reclamation peacetime construction, costs have shown substantial increases over those of the prewar period. Costs have fluctuated from a low point of 155 percent to a high point of about 200 percent of 1940 price levels. The following index ratios indicate relative increases over 1940 construction costs:

	1945	1946
Concrete dams	155	157
Earth dams	165	172
Tunnels	155	156
Canals	160	168
Laterals	163	171
Drains	170	175
Pumping plants	148	149
Power plants	130	149
Transmission lines (wood pole)	142	139

Research

Increased research activities in the Denver laboratories were directed toward the development of new and more economical materials, more practicable design, and improved construction methods. A comprehensive program of research in canal linings was started toward the objectives of improving linings and lowering construction and operating costs. In addition, the laboratories are cooperating in a broad research program of weed control. The ultimate benefits of this program to combat noxious weeds may well extend beyond Bureau project boundaries.

A soils mechanics research laboratory and a bituminous materials laboratory have been added to research facilities during the year. Preliminary plans have been prepared for the construction of 10 outdoor laboratories to permit further and more extensive research in several fields.

Engineers and technicians of the Bureau have continued to devise new methods and equipment. Bureau employees reported 26 inventions during the fiscal year.

Summary of construction results June 30, 1902, to June 30, 1946

Reservoir capacity	acre-feet	67, 897, 248
Waste-water ditches	miles	3, 143
Tunnels:		
Number		355
Length	feet	566, 521
Storage dams:		
Masonry	cubic yards	28, 025, 444
Earth and rockfill	do	55, 221, 677
Total number		100
Diversion dams:		
Masonry	cubic yards	1, 008, 232
Earth and rockfill	do	3, 259, 671
Total number		68
Dikes and levees	cubic yards	13, 277, 667
Bridges:		
Number		13, 902
Length	feet	373, 098

Culverts:	
Number	23, 816
Length feet	1, 085, 166
Pipe laid, length do	12, 937, 155
Flumes:	
Number	6, 244
Length feet	978, 492
Canals:	
Miles	15, 325
Structures number	219, 670
Lined, length miles	1, 250
Power plants:	
Number	33
Capacity kilowatts	2, 178, 197
Output, full year 1946 kilowatt-hours	13, 172, 988, 997
Pumping plants:	
Number	335
Discharge capacity cubic feet/sec	9, 380
Year's pumpage acre-feet	1, 496, 462
Operating transmission lines miles	2, 516
Excavation, all classes cubic yards	625, 574, 739
Concrete do	34, 123, 144
Cement barrels	38, 870, 583

Regional Programs

The activities of the seven Bureau regional offices were greatly expanded. Coordination of activities in the major watersheds and supervision close to the field of operation has been accomplished through regionalization. A summary of important activities in each of the regions follows.

Region 1

Four major high lights featured the Bureau of Reclamation's activities in region 1, the Pacific Northwest. Water was delivered for the first time to two new projects; construction was initiated on the Nation's largest single irrigation system; reclamation farmers recorded the highest gross and per-acre crop values in history; and major strides were made in planning for a vast postwar construction program.

The Bureau's operating projects were increased by the addition of the 50,000-acre north unit of the Deschutes project in central Oregon and the 3,500-acre north unit (Post Falls) of the Rathdrum Prairie project in northern Idaho. Water was delivered to the Deschutes project on May 18, 1946, and to the Rathdrum Prairie project on June 26, 1946. The events were celebrated on both projects.

Crops produced on 13 Federal reclamation projects in region 1, which provide a full or partial supply of water to 1,792,102 acres under cultivation, were valued at $189,921,654, highest on record. The return, which was $11,800,335 more than the previous high reached in 1944, averaged $105.98 per acre, another new peak.

With the Nation calling for utmost food production, reclamation farmers in the Pacific Northwest produced huge quantities of crops in 1945, including 49,000,000 bushels of potatoes (enough to provide a year's supply for approximately 23,000,000 people), 54,000,000 bushels of vegetables, 985,000,000 pounds of fruit, 1,307,969 tons of sugar beets, and 2,276,000 tons of hay and forage crops for beef and dairy herds. Equally high yields are expected during the 1946 irrigation season.

Columbia Basin construction starts.—Construction began on the largest single irrigation development ever undertaken in the United States—the million-acre Columbia Basin project. The first contract work on irrigation facilities, which when completed will cost an estimated $355,344,000, started May 8, 1946. At the end of the fiscal year, contracts valued at $12,608,826 had been let and bids opened for additional work that will cost $2,335,651.

On July 1, excavation for the southerly 6½-mile section of the huge main canal was well under way, and companies holding awards for dams, siphons, tunnels, and for manufacturing equipment to serve the irrigation system, were preparing to start under their contracts. The Bureau's goal was to serve 6,000 acres near Pasco, at the southern tip of the project, in 1947 and 400,000 acres elsewhere in 1951.

Marked construction progress was also made at Anderson Ranch Dam of the Boise project, which when completed will be the highest earth-fill dam in the world. At the end of the fiscal year 7,300,000 of the 8,650,000 cubic yards of material of which the structure will be composed had been placed. The dam will provide supplemental water for 320,000 acres in the Boise Valley. The initial 80,000 acre-feet of storage was provided in the spring of 1946. The project's scheduled completion date is the winter of 1947–48.

Noteworthy also was the construction progress on the Deschutes project. Forty-four miles of the 65-mile long north unit (main) canal, together with laterals and sublaterals to serve 20,000 acres on the north unit during the 1946 irrigation season, were brought to completion. Primary work during the next fiscal year will include construction of the remaining 21 miles of main canal and laterals to serve 30,000 additional acres of land. Part of this new block is to be served in calendar year 1947, and the rest in 1948.

The Roza division of the Yakima project continued to make increasingly large contributions in war foods because of the rapid pace at which construction operations were carried forward. All work authorized under the war food program was brought to substantial completion. The distribution system for the last 5,000 acres of the 47,000-acre gravity unit was nearly complete at the year's end. Previously the last 10 miles of the 95-mile long main canal had been completed. Facilities to serve 25,000 additional acres by pumping from the main canal, on which construction was about to begin at the end of the year, will be substantially completed in calendar year 1947.

Construction was initiated in June 1946, on the Cascade Dam of the Boise project. It will serve 25,000 acres of new land (7,000 of which is

Government-owned and will be opened for homesteading) and also bring a supplemental water supply for 85,000 acres in the Emmett Valley.

On the Minidoka project, the Bureau planned early in the next fiscal year to begin the rehabilitation of the 70-mile long Milner-Gooding Canal and the building of laterals to serve approximately 4,500 of 18,000 acres of public land. A wasteway is to be constructed on the Owyhee project (Oregon-Idaho).

Settlement opportunities—All construction activities in region 1 were aimed at the prime Bureau objective of making settlement opportunities available for qualified veterans as quickly as possible. During the first half of fiscal year 1947, approximately 4,904 acres are scheduled to be opened to homestead entry. Approximately 3,500 acres will be served by the Milner-Gooding Canal of the Minidoka project, 1,254 acres are on the Roza division of the Yakima project, and 150 acres on the Owyhee project. With $28,973,691 in regular appropriations made available by Congress for fiscal year 1947, facilities will be brought to near completion that will supply water for more than 100,000 acres, including 30,000 acres of public land.

Work on two projects in the preconstruction stages was advanced. Investigation work, consisting principally of core-drilling and materials exploration, was in progress at Palisades Dam site in southeastern Idaho. Palisades Dam will provide supplemental water for a large block of irrigated land, a full supply for some new land, produce a sizable block of power, and aid in the control of Snake River floods. Core-drilling and building of an access road was a major activity at Hungry Horse project in northwest Montana. Hungry Horse Dam is being designed to provide storage for irrigation, power development at the site, increasing the firm output of downstream plants (including Grand Coulee Dam) and for flood control and improvement of navigation.

Project investigations.—Project investigation of potential irrigation and multiple-purpose developments received great emphasis. Forty-four widely scattered projects were under study during the year. The largest undertaking was the comprehensive investigation of water resource utilization in the entire Columbia River Basin. At the year's end the 700-page report, drafted in 1945, had been completely revised and was in the process for reproduction.

The study outlines graphically the vast resource-development potentialities in the drainage basin. A total of 238 separate projects, many of them multiple-purpose in scope, are listed. These would provide a full supply of water for 3,840,000 acres of new land and a supplemental supply of 1,520,000 acres now suffering periodic shortages.

A huge new block of hydroelectric power would be produced, including 55.6 billion kilowatt-hours of firm energy, and 9.1 billion kilowatt-hours of secondary power. New installations at 63 additional hydroelectric plants and in existing powerhouses totaling in excess of 10,500,000 kilowatts are forecast.

At 1940 price levels, the entire development program including the $1,000,000,000 transmission system would cost $3,500,000,000.

In addition to the comprehensive Columbia River report, two project investigations were completed: a 230,000-acre unit of the Mountain Home project, near Boise, Idaho; and the Lewiston Orchards project, near Lewiston, Idaho. Three reports were drafted and reviewed by agencies concerned, namely, the Palisades Reservoir project in southeastern Idaho, the Hayden Lake Unit in north Idaho, and the Yakima River channel surveys in south central Washington. A report on the Kennewick division of the Yakima project also was drafted. A basin-wide study of the Rogue River, part of the North Pacific Basin, was well advanced.

Atomic power.—In the field of power, the full scope of the great role played by the Grand Coulee Dam power plant in the prosecution of the war became known for the first time. One of the two factories producing atomic bombs was erected near Hanford, Wash., because of the abundance of power available at Grand Coulee Dam.

Including the Hanford plant, the Grand Coulee generators, together with those at Bonneville Dam, served directly manufacturing facilities with an investment of $573,850,000. These plants represented two-thirds of the total investment in war plants in the area. A substantial proportion of other plants were dependent on Columbia River power but received it through one of the private utilities.

The war industries in the Northwest were awarded $6,590,000,000 in war supply contracts. The wartime production of Pacific Northwest plants included 1,859,685,000 pounds of aluminum ingot, 370,698,000 pounds of aluminum sheet, and 23,858,000 pounds of magnesium ingot.

With the end of the war in August 1945, production of hydroelectric energy on four Bureau projects in region 1 dropped off considerably—from a gross output of 4,894,069,245 kilowatt-hours in fiscal year 1945 to 3,821,414,730 this year. Grand Coulee's plant produced 3,617,025,000 kilowatt-hours; Minidoka, 116,376,500; Boise, 62,253,900; and Yakima, 25,759,330.

Contracts were reinstated for three 108,000-kilowatt generators at Grand Coulee Dam, and bids were called for three additional 108,000-kilowatt units. When these are in operation the rated capacity of the plant will be 1,316,000 kilowatts, making it the largest in the world.

The first application for power from the proposed 40,500 kilowatt power plant at partially-completed Anderson Ranch Dam was received from the Prairie Power Cooperative, Inc., Fairfield, Idaho. It requests 100 to 300 kilowatts of energy.

Employment rises.—The increased activity in region 1 is attested to by employment totals. On July 1, 1945, some 1,773 persons were employed by the Bureau as compared with 3,765 on July 1, 1946. The regional office staff grew from 79 to 205 during the same period.

The major personnel change in region 1 was the appointment of R. J. Newell as Regional Director. Frank A. Banks, formerly Director, asked to be allowed to confine his activities to the Columbia Basin project as supervising engineer. Appointed Assistant Regional Directors in April and June 1946 were J. Lyle Cunningham and Harold T. Nelson.

Columbia Basin Committee.—With the objective of coordinating the planning, construction, and administration of multiple-purpose development programs of the Columbia River drainage basin and the coastal areas in the States of Washington and Oregon which drain into the Pacific Ocean, a Columbia Basin Inter-Agency Committee was organized in April 1946.

On the Committee are represented the Departments of Interior and Agriculture, the War Department, the Bonneville Power Administration, and the Federal Power Commission. Each of the seven basin States are entitled to a representative who serves in an advisory capacity. They constitute a link between the people of the basin and Federal agencies to insure that the local viewpoint on all problems can be given the fullest consideration.

At the end of the year plans were being made for closing the Civilian Public Service Camp for conscientious objectors on the Deschutes project. An average of 90 to 100 men were housed in the camp. The men assisted in clearing Wickiup Reservoir, puddling and priming the main canal, and with other work.

The one Japanese relocation center in region 1, situated at Hunt, Idaho, which had housed an average of 7,800 persons, was closed on October 23, 1946. This center was transferred to the Bureau of Reclamation on July 1, 1946. Some of the facilities will be disposed of to veterans who qualify for settlement of the 3,500 acres of land to be opened to homesteading during the coming fall.

Region 2

Irrigation service to more than one million acres of land, the resumption of a large-scale construction program, and electric power production amounting to nearly one and one-half billion kilowatt-hours, marked the operations of the Bureau in region 2 during fiscal year 1946. Total earnings of the Central Valley project during the year were in excess of $4,000,000. Region 2 embraces three-fourths of California and the Klamath River Basin in southern Oregon.

In the Central Valley area alone, the Bureau furnished irrigation service to 360,000 acres of land throughout the fall months of 1945 and during the early weeks of the new irrigation season in 1946 was releasing stored water for irrigation on 645,000 acres. More than 100,000 acres on the

Klamath project and nearly 30,000 acres on the Orland project also received irrigation water from Bureau-constructed works.

In the Sacramento Valley, water released from Shasta Lake was being used on approximately a quarter of a million acres during the early part of the 1946 season. In the San Joaquin Valley, releases from Millerton Lake are used on 420,000 acres. This area is covered by fifteen interim contracts providing gross revenues of $108,450 to June 30, 1946. This is about one-half the total returns expected for the entire 1946 irrigating season. Major changes in the amount of land served with irrigation water from facilities of the Central Valley project are not expected until after the Friant-Kern and Delta-Mendota Canals are placed in operation.

Large scale construction.—With the release from War Production Board restrictions early in the fiscal year, a large-scale postwar construction program was initiated. This program was based on specifications and other preliminary work accomplished during the war years. During the year, contracts amounting to more than $21,800,000 were let for construction work on the Friant-Kern, Delta-Mendota, and Contra Costa Canals, and for the manufacture of auxiliary equipment at Shasta, Friant, and Keswick Dams. The first of these major contracts was for a 6-mile section of the Friant-Kern Canal, which was placed under construction by a private contractor on September 4, 1945. Additional contracts let on the Friant-Kern Canal during the year brought the total distance under construction to 72.8 miles. A contract for the first 14 miles of the 4,600 cubic-foot-per-second Delta-Mendota Canal was awarded on June 14, 1946. During the year, construction also began on the final section of the Contra Costa Canal, including a terminal reservoir near Martinez.

In addition to major work now in progress, the construction schedule for fiscal year 1947 includes the installation of spillway drum gates at both Shasta and Friant Dams, fourteen 108-inch valves in the spillway outlets at Shasta, completion of three penstocks for the Shasta power plant, and the erection of stairways, elevators, and other miscellaneous facilities at Shasta Dam. Work is under way also on erection of 50- by 50-foot spillway gates and related work at Keswick Dam. On the Contra Costa Canal, contracts have been awarded for the construction of the Ygnacio and Clayton pumping plants and construction of these facilities is expected to begin during the latter part of 1946. No major construction work is contemplated on the Orland project but on the Klamath project construction of the 110-foot high Boundary Dam is expected to start during the early months of fiscal year 1947.

Shasta power peaks.—Operating at approximately 13.5 percent overload throughout the entire year, the two 75,000 kilowatt generating units in the Shasta power plant produced 1,486,578,600 kilowatt-hours of electric energy. The generators at Shasta Dam were used to provide part of the base load of the Pacific Gas & Electric Co., which takes the major portion of the output under a war-duration contract.

Interdepartmental sales of electric energy began on July 1, 1945, to the Delta pumping plants of the Central Valley project and to the steel pilot plant of the Bureau of Mines at Shasta Dam. The Bureau operated the Shasta substation section of the Shasta-Oroville transmission line. The remaining section of the line is under lease to the Pacific Gas & Electric Co.

On July 23, 1945, the city of Roseville signed an electricity supply contract with the Bureau for its municipal distribution system, calling for service to commence by December 31, 1946. Extension of the Shasta-Oroville transmission line to Sacramento was authorized by the Congress and appropriations made for that purpose. Preliminary construction of the line started during the late months of fiscal year 1946. To carry out congressional mandates regarding the distribution of publicly generated power, it will be necessary ultimately to extend this transmission line to the Delta area near Tracy, Calif., to supply power service for Central Valley project pumps. However, this single 230-kilovolt transmission line cannot guarantee uninterrupted power supply without some type of standby service such as additional transmission lines or an auxiliary steam plant.

The Power Branch of the regional organization conducted economic studies for rate schedule purposes, and engaged in cost allocations and market studies during the year. In January 1946 it completed the first of a series of reports entitled "A Six-Year Advance Program of Power System Development—Fiscal Years 1947–1952."

At Shasta Dam, installation of miscellaneous power equipment and the erection of two 75,000-kilowatt generator units loaned to Grand Coulee for the actual duration of the war, began during the early months of 1946. This work will continue throughout the year with the expectation that these units will go on the line late in 1947. At the close of fiscal year 1946, the installation of miscellaneous power-plant machinery at Keswick Dam was in progress with plans in effect to continue this work throughout fiscal year 1947.

The fifth and final 75,000-kilowatt generating unit for the Shasta power plant is in process of manufacture and preliminary work in the power plant, looking forward to its installation, will be carried out during 1946 and 1947. Similar plans are in effect for installing three 25,000-kilowatt units at Keswick Dam.

Central Valley comprehensive plan completed.—Of major importance to the future development of the water resources of the Central Valley of California was the completion, on November 1, 1945, of the Comprehensive Plan for Water Resources Development—Central Valley Basin, California. During the year this report was submitted for review, as required by law, to the Governor of California and to other agencies concerned. At the close of the fiscal year the comments of the various reviewing agencies had been received and steps are being taken to prepare the report in final form for submission to the President. This report emphasizes the necessity for coordinated and integrated development of the water resources of the Central Valley. Project planning forces of region 2 are engaged and will continue to be engaged throughout the coming year in the detailed investigations necessary to amplify the comprehensive outline presented in the basin-wide study. This work points ultimately to feasibility reports on the specific features proposed in the basin report.

A similar comprehensive basin-type report for the Santa Barbara area was transmitted to the President through the Bureau of the Budget on May 16, 1946. Investigations are continuing also in the Santa Barbara area with the added specific purposes of providing a basis for a repayment contract for irrigation and municipal water facilities as proposed for construction by the Bureau of Reclamation.

After a public hearing, conducted by the Corps of Engineers, at Klamath Falls, Oreg., and Yreka, Calif., in February 1945 on their proposal to divert Klamath River water into the Central Valley, there was widespread public demand for the Bureau of Reclamation to conduct a comprehensive study of the water resources of the Klamath Basin. In June of 1946 the Bureau established a project planning office at Klamath Falls to conduct this study. At year's end it was in progress and, due to the complexities of water distribution problems in the Klamath Basin, may take more than 3 years to complete.

Water storage benefits.—During the 1945-46 rainy season, storage in Shasta Lake reduced the flow of the Sacramento River at that point from 100,000 to 5,000 cubic feet per second, thus making a substantial contribution to flood protection on the lower reaches of the river. Stored water released from Shasta Lake produces power, aids in the propagation of salmon and other fish life, irrigates nearly a quarter of a million acres of crops along the Sacramento River, maintains a flow sufficient for navigation, furnishes the major portion of the flow necessary to prevent ocean water encroachment on 450,000 acres of rich Delta land, and via the Contra Costa Canal, supplies farms, large industries, and municipalities along the south shore of Suisun Bay.

For the second successive season, water passed the spillway crest of Friant Dam. Pending completion of the Delta-Mendota Canal, water from the Millerton Lake is used to satisfy the Miller and Lux exchange contract, furnishes water on an interim basis to 420,000 acres and via the Madera Canal delivers water for ground-water replenishment in the Madera irrigation district.

Water contract signed.—On October 18, 1945, the board of directors of the Southern San Joaquin municipal utility district signed the first water contract ever consummated under the provisions of section 9 (e) of the Reclamation Project Act of 1939. This contract provides for the delivery of a maximum of 91,000 acre-feet of class I water and 33,000 acre-feet of class II water annually from the Friant-Kern Canal. Contract negotiations with three additional districts were in advanced stages on June 30, 1946, and negotiations, including studies of irrigation distribution systems, are in various stages of completion with nine other districts in the Friant-Kern Canal service area.

The Contra Costa Canal was operated during the year to deliver 11,590 acre-feet of water under an interim contract which returned a revenue of $43,450, an amount sufficient to cover operation and maintenance costs. In the absence of an irrigation distribution system, 7 percent of this water was used for agricultural purposes from canal-side pumping, while 78 percent was consumed by industries and 15 percent by municipalities. Negotiations for a permanent contract including arrangements for irrigation distribution systems are currently in progress with directors of the district.

During the year a wide range of studies including 1945 crop surveys, weed surveys, analyses of excess land holdings, consumptive use studies, preliminary water requirements, land classification, cost allocation studies, and related investigations were completed in preliminary stages and most of them will be carried forward on a more deailed basis during the ensuing year on present and proposed projects within the region.

Of primary importance to the Central Valley project was the cost allocation study, which was in an advanced stage of completion at the end of the year.

Region 3

The Bureau's hydroelectric plants on the lower Colorado River, producing about half of the power generated on all Bureau projects, continued to make region 3 the "powerhouse" of the Southwest. Water used in the generation of power was reused to irrigate hundreds of thousands of acres served by Reclamation facilities.

Having supplied about half of the power needs of the Los Angeles metropolitan area during the war years in addition to serving areas in Arizona and southern Nevada, power generated by Boulder and Parker Dams is now playing an equally important part in the Southwest's reconversion program. The Salt River Valley, Yuma Valley, Imperial Valley, and other irrigated areas served by Reclamation facilities are continuing their high rate of production, established during the war, to help bolster the Nation's short food supply.

The Boulder and Parker power plants, and a small plant on the Yuma project, generated a total output of about 5⅔ billion kilowatt-hours during the fiscal year 1946. Crop production for the calendar year 1945 from 741,843 acres served by Reclamation facilities was valued at $111,509,257, about the same as for the previous year.

On VJ-day the Bureau was given the "green light" to proceed with projects held up by the war. The construction program on projects in this region was accelerated. Construction of Davis Dam, 67 miles downstream from Boulder Dam, was officially begun April 19 by the contractor, the Utah Construction Co. Construction of irrigation systems and predevelopment of land on the Gila project near Yuma, Ariz., and extension of the Coachella Main Canal in southern California, were accelerated.

Davis Dam.—Contract for construction of Davis Dam and powerhouse, largest Colorado River project since the completion of Boulder Dam in 1936, was awarded to the Utah Construction Co. in January at a contract price of $21,462,505. Total project cost, including generating machinery and transmission system, is estimated at $77,000,000. A construction camp has been established at the damsite and more than one thousand construction workers are now actively employed. The construction period will extend over 3½ years.

Primarily designed as a power project, Davis Dam will also provide regulation of the river flow below Boulder Dam for the benefit of irrigated areas in this country and Mexico, together with incidental benefits to wildlife and recreational interests.

The Davis Dam power plant will have an installed generating capacity of 225,000 kilowatts, bringing the region's hydroelectric capacity to more than 1⅓ million kilowatts and adding from three-quarters of a billion to a billion kilowatt-hours annually to the present output along the river.

Transmission systems.—The second Parker-Phoenix 161-kilovolt line was completed, except for relay protection, and was placed in operation on a temporary basis.

Contracts covering major items of terminal equipment for the Parker-Gene 230-kilovolt interconnection were awarded. The interconnection, scheduled for completion during the next year, will provide an additional 90,000 kilovolt transformer bank to the present tie between the Parker and Boulder transmission systems.

Coachella Main Canal.—This vital water artery, which will irrigate some 75,000 arable acres of land in the rich Coachella Valley of southern California, is expected to be completed sometime in 1948. Almost 90 percent of the 145-mile-long canal, which is a branch of the All-American Canal System, was completed or under contract.

The Coachella Valley County water district currently is considering a supplemental repayment contract for the construction of a distribution system to serve the valley. The contract would authorize the Bureau to request funds from the Congress for the construction of a distribution system. Emphasis is upon the early relief of the present planted acreage in the valley for which the existing water supply from underground sources is inadequate.

Gila project.—On the Yuma Mesa division of this project, over 6,000 acres of land are leveled. Some 3,500 acres are planted to alfalfa or to a nurse crop. The Yuma Mesa division contains about 40,000 acres of land in public ownership which will be made available for homestead entry at a future date. About 10,000 acres of public land are slated for initial settlement by veterans late in 1947.

On the Gila project, ditch test sections were prepared by oil treatment as a part of the experimental work in seeking means by which water losses in farm ditches may be reduced. Plans were made during the last quarter of the fiscal year to extend this activity and, under a joint program sponsored by the Branches of Operation and Maintenance and Design and Construction, to determine the most economical methods for preventing water losses in canals, laterals, and farm ditches.

East Mesa.—Land classification surveys on East Mesa, All-American Canal System, were continued and a final report was prepared. Preliminary negotiations with the Imperial irrigation district regarding a distribution system for 10,000 acres were begun. This area will serve as a full-scale trial or demonstration of the agricultural possibilities of the mesa soils.

Yuma project.—Plans were largely completed for connection of the Bard irrigation district, Reservation division, laterals to the All-American Canal. Construction of these connections will be under way early in the fiscal year 1947. The connections will provide greater operating flexibility for the lower Colorado irrigation program and will permit the opening of Laguna Dam for sluicing silt and sand deposited between Imperial and Laguna Dams by the desilting works. Laguna Dam thus will become an operating adjunct of Imperial Dam and a part of the All-American Canal System. Work was initiated to establish the factual basis of recommending a rehabilitation program for the Yuma project.

The soil and moisture conservation program on the Yuma project was continued, activities consisting mainly of the accumulation of additional information regarding ground-water levels in relation to the volume of water diverted into the canal and lateral system. The program for the fiscal year 1947 was formulated with special emphasis on the possible influence of irrigation of the new lands of the Yuma Mesa of the Gila project on the valley lands of the Yuma project and the South Gila irrigation district. The grid of observation wells will be increased in number, and the work will be carried on jointly by the superintendents of the Yuma and Gila projects and coordinated by the district engineer.

Weed control.—On both the Yuma and Gila projects, an intensified program of weed control was launched. Systematic burning of weeds along canal banks of the Yuma project will be continued throughout the fiscal year 1947. The use of oil spraying and new chemical methods of weed control, separately and together with burning, was investigated on the Yuma project.

On the All-American Canal project, the regional weed-control specialists assisted the project forces in establishing an effective program for the removal of the vegetative growth in the All-American Canal.

Present plans for the rehabilitation and maintenance work in the All-American Canal upstream as far as Pilot Knob wasteway will be effected by December 1946.

Colorado River Basin Report.—Regions 3 and 4 are jointly responsible for completing a comprehensive report entitled "The Colorado River, 'A National Menace Becomes a National Resource.' " This report inventories water and other resources in the Colorado River Basin, summarizes the present irrigation, power, and municipal uses of water of the Colorado, and presents future developmental possibilities for the use of Colorado River water for irrigation, power, municipal supply, and other beneficial purposes. The report describes 134 projects, or units of projects, which could be developed in the natural drainage basin of the Colorado River and recognizes that additional potential projects outside the Basin could be supplied by the exportation of Colorado River water. The construction cost of the 134 projects, or units of projects, is estimated to be 3½ billion dollars based on present prices. The possibilities for use of water exceed the water supply. The report therefore suggests that the States concerned recommend a group of projects which will fall within the ultimate allocable supply available and that the States mutually settle upon their respective rights to Colorado River water.

Sub-basin and project reports.—Region 3 has been preparing sub-basin reports on the Virgin, Little Colorado, and Muddy Rivers and recently started investigations in the Upper Gila sub-basin, New Mexico. Reports on nine comparatively small irrigation projects in Utah, Nevada, and Arizona were in the course of preparation; on two of these, preliminary drafts have been circulated. In addition, engineering field studies were made of a combined intake for the Palo Verde irrigation district and a possible Palo Verde Mesa irrigation project, California. A preliminary report was prepared, and circulated, of costs and route to be followed to furnish San Diego, Calif., with Colorado River water from the All-American Canal.

Central Arizona project.—An important cooperative investigation, the Central Arizona project, in which Arizona matches funds to the extent of $200,000, is being carried on to study the furnishing of Colorado River water as a supplemental supply to about 600,000 acres in the valleys of the Gila and Salt Rivers near Phoenix, Ariz., where excessive pumping has depleted the ground water supply and where the lack of water has become a serious threat to this highly developed area.

A comparison report, distributed in preliminary form in October 1945, reduced the consideration of possible feasible aqueduct routes from three to two. Since then, there has been in the course of preparation an interim report taking up the furnishing of Colorado River water to central Arizona from a diversion at the potential Bridge Canyon Reservoir. From this reservoir, water would be conveyed through the potential Big Sandy Tunnel, about 80 miles long, then in an aqueduct 248 miles long to the potential McDowell Reservoir on Salt River east of Phoenix. If Bridge Canyon Dam is built, silt storage will be needed on the Colorado River system upstream. A start has been made toward investigating a silt storage reservoir at the Coconino site on the Little Colorado River.

A second interim report will cover investigation of an aqueduct that would supply Colorado River water to central Arizona from Havasu Lake above Parker Dam. In this case water would be elevated about 1,000 feet by pumping to the aqueduct, then carried about 235 miles to Granite Reef Reservoir on Salt River east of Phoenix.

River control.—The regional office of river control was established for the primary purposes of formulating and executing plans for physical control of the Colorado River and its tributaries within the region, to control and apportion the water of the river according to intended functions, and to handle administrative problems arising under the Mexican treaty.

The regimen of the river has been and will continue to be altered by the construction of Boulder, Parker, and other dams. This fact has introduced many difficult problems. The silt-bearing river, deprived of its silt, issues clear below the dams in a channel previously adjusted through the ages to accommodate silt-laden water. Under such circumstances it is a natural phenomenon for the clear river to strive to recharge its silt load, and to adjust its alignment and grade for restoration of the natural characteristics. The river bed further downstream becomes unstable with an increased tendency to meander, raising the elevation of the river bed and forcing the deposition of silt to progress upstream until a new balance is reached.

The "Needles situation," over the entire 12-mile section of the river from Needles to Topock, is an example of this building up of the valley floor. Emergency measures to control this situation are now in progress. Permanent correction of the situation has been provided by an act to amend the laws authorizing the performance of necessary protection work between the Yuma project, near the Mexican border, and Boulder Dam, some 300 miles up the river. This act was signed by the President during the latter part of June 1946. While this act authorizes the Bureau to perform the work necessary for the permanent alleviation of this section of the river, it makes no appropriation of funds.

Specifications were prepared for the proposed dredging of the river channel at Needles. These specifications will be formally advertised during the next year.

Emergency measures at Needles consisted of the raising of the protecting levee to within about one foot of its designed grade, the placing of riprap along the riverward face at critical sites, and the continuous pumping of seepage water from the affected areas in the outskirts of the city.

To penetrate the dense swamps of tules, willows, cottonwood trees, and other vegetation in the valley sections of the river, Bureau survey parties are now using amphibious vehicles officially known as the Mark 3 landing vehicle (LVT–III). These amphibians, like those that stormed the beaches of the southwest Pacific in the latter months of the war, carry the surveyors to points in the swamp which previously were almost inaccessible. In addition, surplus walkie-talkie two-way radio sets are being used by the surveying parties to maintain constant contact.

In addition to the physical control of the river bed, the office of river control administers the control of water, which is necessary for the conservation of supply and achievement of maximum benefits. This control includes the dispatching of water required for irrigation, flood control, navigation, domestic use, power generation, and fulfillment of the Mexican treaty obligations, as controlled through release of reservoir storage and balanced against the available supply.

The control of water begins with forecasting the supply which will be available. To this end, investigation of forecast methods has been carried on. Forecasts of inflow to Lake Mead have been made by this office during the years 1945 and 1946.

As the 1946 snow run-off season on the Colorado River approached, it was apparent that inflow to Lake Mead would be far below normal. Accordingly, beginning with June 1, 1946, the start of the new power contract year, releases from Boulder Dam were reduced to the minimum necessary to satisfy downstream demands for irrigation and other uses. A system of careful daily scheduling of releases from Boulder and Parker Dams for 1 week in advance was initiated, in order to reduce run-off to the Gulf of California to a minimum. Such a system of scheduling must be followed in years of water shortage. In years of excess run-off, on the other hand, when flood waters must be accommodated, it will also be necessary to schedule releases carefully. The problem then will be to provide storage space for future floods, at the same time keeping the flow low enough to avoid damage to lands along the river.

San Diego aqueduct.—The 71.5-mile San Diego aqueduct was originally planned and financed as a war measure to provide a supplemental water supply from the Colorado River for the naval installations and war industries in the San Diego area, and the war-swollen population drawn into that area by these activities. Preconstruction surveys by the Bureau of Reclamation were completed in June 1945, plans and specifications were prepared in the Chief Engineer's office, and the last of the seven contracts into which the job has been divided was awarded by the Navy in November.

Following VJ-day immediate cancellation of all these contracts, threatened by the Navy, was averted only by the signing of a contract by the city of San Diego agreeing to repay the Navy over a 30-year period the entire construction cost. Work under all contracts is now in progress under Navy supervision, with the Reclamation Bureau as consultant assisting in inspection of field work and review of ship drawings and proposed changes of construction plans to fit field conditions.

Lower Colorado River district.—As of June 1 the lower Colorado River district was established with a district engineer at Yuma in administrative charge, under the Regional Director, of Gila project construction, Gila project operation and maintenance, Yuma project operation and maintenance, and Imperial division, All-American Canal, construction and operation and maintenance. Simultaneously, the Coachella division, All-American Canal, was established as an autonomous project, under a construction engineer reporting administratively direct to the Regional Director.

Region 4

The transition from war to peace in region 4 during fiscal year 1946 was marked by the need of expanding the investigation and construction programs in the face of continued war scarcities including housing, equipment, and materials of all kinds; the necessity for new economic studies in connection with the new crops and crop values developed during the war, and the detail work of negotiating amendatory repayment contracts to match the increased costs of construction and the changed economic status of existing irrigation projects.

Under War Production Board and War Food Administration priorities, the Scofield, Utah, and Newton, Utah, projects were continued to completion approximately as planned. Some work was accomplished by the Bureau on the Mancos, Colo., project with the help of a Civilian Public Service camp, but since February 1946 little has been done pending authorization of new funds.

As the labor situation improved, activity increased on the Provo River project, Utah, where employment of 61 additional employees increased total personnel to 143. Construction of a 10½-mile section of concrete pipeline for the Salt Lake aqueduct was finished, bringing to completion 27 miles of the 40-mile conduit that will carry water to Salt Lake City and surrounding area. Eighty percent of the excavation for the enlargement of the Provo Reservoir Canal was accomplished and the last of the siphons, except the Jordan Narrows siphon and pumping plant, were installed in the canal line. Work was nearly completed on the Weber-Provo Diversion Canal with the construction of several irrigation structures and the placing of concrete lining in some sections, leaving 4,000 feet of concrete lining as the only work yet to be done on the canal. Work has not yet been resumed on the 6-mile Duschesne Tunnel, nearly half completed in 1942 when a War Production Board order halted construction.

Completion of the dams for the Newton and Scofield projects during the year brings the number of reservoirs in the region to a total of 16, with an aggregate active capacity of 2,125,000 acre-feet of water. These reservoirs, together with natural flow for direct use, supplied irrigation water to 16 operating projects, the Provo River and the Scofield projects being operated during construction.

Crop production up.—For the calendar year 1945, during which water supply conditions were favorable, 486,600 acres in cultivation produced crops valued at $38,120,000. This represents an increase of $3,420,000 over calendar year 1944. In addition, some water was delivered and crops were grown under the old privately constructed irrigation systems on the Mancos and Eden projects where construction of dams had been commenced by the Bureau, but suspended during the war.

Alfalfa and grains maintained their position as top producers on irrigated lands in region 4 and are important crops to the livestock and dairy industries of the intermountain area. Potatoes, sugar beets, truck crops, and fruits are gaining in favor.

The ability of the Bureau reservoirs to furnish domestic and industrial water supplies as well as irrigation water will continue to be an important factor in the industrial development of the region. Transfer of the Geneva steel plant, which receives water from the Provo River project, from Government to private ownership with assurance of continued and increased operation of this industry gives promise of industrial expansion and growth for the intermountain area.

Bureau reservoirs continued to plan an important role in providing recreational facilities for the intermountain area. Many of them are near relatively thickly populated areas and provide boating, swimming, and fishing activities while others are more remote, but make up in scenery and excellent fishing for the extra distance that must be traveled to reach them. Thousands of vacationists have enjoyed the facilities afforded, and indications point to the growing importance of, and necessity of planning for, reservoirs as recreational areas.

Reclassification survey.—A detailed land reclassification survey and economic study on 130,000 acres of the Uncompahgre project was completed as was a detailed land classification of the Lyman project, Wyoming, and semidetailed land classification of the Malad, Idaho, and South Cache, Utah, projects. Reconnaissance land classification of the Upper Gunnison project, Colorado, and semidetailed land classification of the Glendale-Mapleton project, Utah, and Bear River project, Utah, Wyoming, and Idaho, were planned for completion within the fiscal year 1947. In addition, economic surveys for the Ogden and Provo River project areas are in final stage. These surveys to determine the water users' repayment ability will furnish a basis for consideration of amendatory repayment contracts which are expected to be negotiated during the ensuing fiscal year.

An active weed control program has been developed cooperatively with Federal, State, and private agencies. Concurrent research programs to develop technical information and determine adaptibility of new chemicals and new procedures to weed work were instituted at the same time.

Total personnel increased from 302 to 638 during the year. Most of this increase was required to initiate peliminary investigations of potential projects and to accelerate schedules delayed by loss to war work of men trained in reclamation planning. Forty-one employees returned from military furlough and approximately 70 percent of other additions were veterans. Field offices were expanded at Logan and Vernal, Utah; Carson City, Nev.; Durango, Grand Junction, and Gunnison, Colo. New offices were opened at Kemmerer, Wyo., Steamboat Springs, Colo., and Spanish Fork, Utah. The Provo River project office nearly doubled and plans were made for the early establishment of Bureau offices at Naturita, Colo., and Ogden, Utah, with still other localities under consideration as sites for offices yet to be set up.

River Basin studies.—Basin-wide studies, designed to formulate a pattern for the greatest ultimate development of the three major drainage basins in region 4, were completed during the year and reports completed or nearly so far all three basins. The Colorado River report, written in cooperation with region 3, and covering some 134 potential projects, project extensions or other important units, was approved June 7, 1946, and submitted to reviewing agencies. The Bonneville Basin report, including approximately 25 potential developments, has been completed in draft form. The Lahontan Basin report covering approximately 20 potential projects was nearing completion at the close of the fiscal year.

Detailed surveys of specific projects will command principal attention in the region for the next year. A report on the Paonia project, Colorado, has been submitted to the Governor of Colorado, to the Secretary of War, and to the Federal Inter-Agency River Basin Committee. Reports on the Hammond project, New Mexico, and the Gooseberry project, Utah, have been completed in draft form. Other projects upon which reports are nearing completion include: Malad Valley project, Idaho; Silt, West Divide, Fla.; Dolores and Pine River Extension projects in Colorado; La Plata project, Colorado-New Mexico; Emery County, Jensen, and Vernal projects, Utah; and the Lyman project, Wyoming. Detailed investigations are also under way on about 20 other projects.

It is expected that the way will be cleared in the near future for resuming construction on the Mancos, Colo., and Eden, Wyoming, projects which with the Provo River project and a small amount of work to complete the Ogden River project will make up the construction program for the next fiscal year.

Power investigations.—Power, as an aid to irrigation and industrial development, is becoming of increasing importance and, of the many possibilities in region 4, the Diamond Creek, Echo Park, and Truckee-Carson potentialities have been chosen for detailed investigations during the following year. Population growth and industrial expansion in region 4 continues at a rapid rate. Development of multipurpose projects to provide at the earliest possible moment the two major needs (irrigated farm homes and electrical energy) has become a necessity.

The 1,690-acre Pitt Ranch on the Humboldt River, purchased by the Government during acquisition of water rights was sub-divided and disposed of during the year. Thirty-five right-of-way purchase contracts were completed on the Provo River project and new or renewal leases for Bureau-owned or controlled lands were executed on approximately 21,000 acres.

The heavy demands for equipment, materials and supplies were met without serious delays despite critical market conditions in general. Old Civilian Conservation Corps buildings were converted into housing units at two locations and 51 Federal Public Housing Authority units were obtained for a housing project in western Colorado; 22 house trailers were purchased to alleviate the housing shortage; surplus property proved an excellent source of supply for critical items.

Material on Reclamation's role in conservation of natural resources was prepared at the request of the Utah Department of Public Instruction, for inclusion in their manuals for the seventh grade, twelfth grade, and adult classes.

Region 5

Six projects were in operation or under construction in region 5 of the Bureau of Reclamation at the end of fiscal year 1946. Nine river basins, three important subbasins, and 24 projects were under investigation, and reconnaissance or preliminary study was being made of 18 projects. Land development programs were in progress on two projects under construction. Transmission systems were fanning out from Elephant Butte Dam, delivering 109,361,526 kilowatt-hours of energy and bringing in revenue amounting to $359,226.

Highlights of the year were: opening of the new Balmorhea, Tex., project; dedication of the Lugert-Altus Dam near Lugert, Okla.; and formation of an irrigation district at Canton, Okla.

First contract for the Balmorhea project was awarded June 19, 1946. The project is designed ultimately to provide supplemental water for 7,400 acres now receiving an inadequate supply, and a full water supply for 3,260 acres of new land.

The Lugert-Altus Dam was dedicated at an impressive ceremony on January 30, 1946. It is a concrete gravity-type, partially curved structure rising approximately 100 feet above the North Fork of the Red River, and has a crest of 1,160 feet. The reservoir, with a capacity of 163,000 acre-feet, impounds water for the ultimate irrigation of between 60,000 and 70,000 acres in the Lugert-Altus irrigation district.

Landowners along the North Canadian River in Oklahoma voted December 4, 1945, to form the Canton irrigation district of 21,710 acres in the area from Canton to Karns Spur. The vote was 96 to 42. Final draft of the Canton project report is in the process of reproduction.

Major activities of region 5 during the 1946 fiscal year are outlined in the following reports of various branches and divisions.

Construction.—Five projects in region 5 are now under construction. These comprise: Tucumcari, N. Mex.; Altus, Okla.; Balmorhea, Tex.; Rio Grande (storage and power division only); and Marshall Ford Dam on the Colorado River of Texas.

Water for the Tucumcari project is obtained from the Conchas Reservoir on the South Canadian River, and is brought to the irrigable 45,000 acres by a canal of total length of 77.3 miles. The project is 68 percent complete, with expenditures amounting to $9,493,000. A total of 56 miles of the Conchas Canal has been completed, and irrigation is now available for the first 6,672 acres. Five tunnels and 33 concrete siphons are in the canal system.

The Lugert-Altus Reservoir on the North Fork of the Red River provides water for the Altus project. The dam is 99 percent complete. The main canal and a portion of the Altus Canal are complete, and irrigation of the first land is under way. The project is 57 percent complete, with total expenditures of $6,809,170. The project includes 52,000 net acres of irrigable land. Work is under way on the Altus Canal, the West Canal, Altus City pipe line, and the Altus Blair and West laterals and sublaterals.

First contract for the Balmorhea project was awarded June 19, and construction is expected to start during July 1946. Expenditures to date total $38,000. The project is 10 percent complete on a cost estimate.

The storage and power division of the Rio Grande project is approximately 86 percent complete. Expenditures to date total $10,314,645, and the cost of work yet to be performed was estimated originally at $1,748,000. Remaining work includes construction of transmission lines to Alamogordo and Hollywood, N. Mex., and from Elephant Butte Dam to Socorro and Albuquerque, N. Mex. Spillway repairs will be made on Elephant Butte Dam at an estimated cost of $150,000.

Expenditures on the Marshall Ford Dam to date total $23,914,209. This structure will be turned over to the Lower Colorado River Authority in the near future in accordance with the contract of 1941. Remaining work will be performed with $68,400 appropriated by the Congress for 1947.

Authority was delegated in January 1946 to the Design and Construction Branch to prepare preliminary designs and cost estimates for project planning feasibility reports, and this work was carried out as authorized on the Canton, Okla., and Hudspeth, Tex., projects. Reviews of project reports with reference to design features and cost estimates have been made for the Robert Lee, San Angelo, Fort Sumner, and Balmorhea projects. Special reports were completed for the Carlsbad project and Guadalupe Basin Report. These reviews included an analysis of 1940 and present day construction costs, and a review of design and construction features with recommendations.

Scheduled work.—The major part of the Tucumcari project is scheduled for completion in the 1947 fiscal year, with remaining lateral construction work and drainage extending into 1948. An expenditure of $4,462,332 is planned in 1947 and 1948 to complete the project. All funds are now available for use.

The Altus project is scheduled to be completed by end of the middle of 1948. Future work will include construction of the Ozark canals, Ozark laterals and sublaterals, and drainage work. Appropriation for the remaining work total $5,091,610.

Completion of the storage and power division works in the Rio Grande project area is scheduled to be completed during fiscal year 1948.

Work remaining on the Colorado River project, Texas (Marshall Ford Dam) includes the purchase and installation of a gantry crane and a standby generating unit, road repair, painting of damaged areas and miscellaneous work all to be completed in 1947.

All work on the Balmorhea project is scheduled for completion in the 1947 fiscal year when the remaining $342,000 of the total estimate cost of $380,000 will be expended in the construction of Phantom Lake Canal and the Inlet Feeder Canal. These canals are expected to deliver water by November and December 1946, respectively. Expenditures to date total $38,000.

Plans are being developed for the possible start of construction work in the 1948 fiscal year on the San Luis Valley, Valley Gravity, Fort Sumner, and Canton projects.

Planning developments.—Planning work for water resources development included investigation of 9 river basins, 3 important subbasins, 24 projects, and reconnaissance or preliminary study of 18 projects. In addition, detailed surveys and preparation of construction plans were in progress for 3 projects.

Drafts of reports on the Nueces and the Rio Grande Basins, and the Middle Rio Grande project have been completed. The close of the fiscal year also found final drafts of the Canton, Robert Lee, and Balmorhea project reports in the process of reproduction.

Preliminary reports have been prepared on the Fort Sumner and Tucumcari water supply projects.

During the first quarter of the fiscal year 1947, it is expected that reports will be completed for the Canton, Robert Lee, Balmorhea, San Angelo (North Concho), Fort Gibson Reconnaissance, and Hudspeth projects, the Guadalupe and Arkansas River Basins, Rio Grande project recreation and Carlsbad project recreation. During the second quarter, completion of reports is scheduled for the Fort Sumner, Mud Creek Reconnaissance, and San Luis Valley (Conejos division) projects.

In the third quarter, reports are scheduled to be completed for Capulin Reconnaissance, Valley Gravity, Englewood and San Luis Valley (Rio Grande division) projects, and for the Washita River subbasin. During the fourth quarter, reports are to be completed for the Black Mesa Reconnaissance, Mora Reconnaissance and Kenton projects, and for the Pecos River subbasin.

Major operation and maintenance activities were confined to four projects in operation or under construction.

Rio Grande project.—Some 154,862 of the 178,073 acres in New Mexico and Texas in the project area were irrigated in 1945. The 6,518 irrigated farms in the area had a population of 33,060. Gross crop returns for 1945 were $22,389,974, an average gross return of $144.58.

Carlsbad project.—One of the oldest irrigation projects in the Western United States, the Carlsbad project is in critical need of rehabilitaton. An economic study is being conducted as a basis for definite plans to accomplish this restoration. The project embraces 25,055 acres in the Pecos River Valley of New Mexico. Drouth increased the water shortage problem in 1945 when 20,715 acres were under irrigation. There were 459 farms in the area, with a population of 1,954. Gross crop returns were $1,539,966, an average of $74.34 an acre; a decrease of $300,000 and $13, respectively, over 1944 returns.

Altus project.—Irrigation facilities to serve approximately 1,300 acres of project lands were completed by June 30. When completed, the Altus project will contain approximately 55,000 acres of irrigable land. Dryland farming on 71,167 acres in the area resulted in gross crop returns of $1,631,297 for 1945, an average of $24.59 per acre. There were 512 farms in the area with a population of 996.

Tucumcari project.—Land development work has been done on 3,899 acres of the 45,000-acre project, and 1,544 acres have been smoothed for irrigation. An estimated 900 acres of wheat and 40 acres of alfalfa were planted in the fall on developed irrigable land. This was irrigated in the spring, and a good stand of wheat was secured. The project was not operating at the close of 1945, and lack of preirrigation data prevented the compilation of a crop and livestock report.

The 1947 program is designed to help farmers solve important problems in connection with the first use of irrigation water. The program includes: advising in the use of water; predevelopment of farm land, advice on farm management, completion of farm unit studies for use in directing settlement, and water duty studies for scheduling economic consumption and delivery of water.

Power facilities.—A 115,000-volt transmission system from Las Cruces to Alamogordo Air Field, N. Mex., was completed last year. The 70-mile line was built for delivery of power to Alamogordo Air Field and the White Sands Proving Ground.

The Bureau's power facilities for region 5 consist of a hydro-generating plant at the toe of Elephant Butte Dam and transmission system. The Elephant Butte plant consists of three 8,100-kilowatt generating units with an estimated annual salable output of 107,000,000 kilowatt-hours. Total energy delivered for the fiscal year 1946 was 109,361,526 kilowatt-hours, with an electric revenue of $359,226.92. Power has been allocated equally for use in New Mexico and Texas. Two hundred and twenty-five miles of transmission lines are used to market the power over the area of southern New Mexico and El Paso, Tex.

The transmission system consists of the following lines: Elephant Butte to Deming, N. Mex., for delivery of power to the Deming Ice & Electric Co., 76.20 miles, 115,000 volts; Deming to Central, N. Mex., for delivery of power to the Community Public Service Co., 42.32 miles, 115,000 volts; Elephant Butte to Hot Springs, N. Mex., for delivery of power to the town of Hot Springs, 3.75 miles, 13,800 volts; Elephant Butte to Las Cruces, N. Mex., 63 miles, for delivery of power to the El Paso Electric Co.; Las Cruces to Alamogordo, 70 miles, 115,000 volts.

The following transmission lines are under construction or authorized: Alamogordo Air Base to Hollywood, N. Mex., for delivery of power to Community Public Service Co. at Alamogordo and Hollywood and Otero County Electric Cooperative at Alamogordo and Hollywood, 55 miles, 115,000 volts; Elephant Butte to Albuquerque for delivery of power to Socorro Electric Cooperative at Socorro, N. Mex., Community Public Service Co. at Socorro and Albuquerque Gas & Electric Co. at Albuquerque, N. Mex., 150 miles, 115,000 volts.

Proposed additional plants include El Vado, 10,000 kilowatts scheduled in 1949; Chamita, 15,000 kilowatts in 1950; and Abiquiu, 15,000 kilowatts in 1953. These plants will be located in the north central part of New Mexico on the Rio Chama.

Region 6

The Flood Control Act of 1944 approved the comprehensive plan of the Bureau of Reclamation and the Corps of Engineers for the conservation, control, and use of the water resources of the Missouri River Basin, and contained authorization for the construction of its initial stages.

During fiscal year 1946, the activities of region 6 have been largely concentrated on work required to bring the first six authorized units up to the construction stage, including the preparation of construction plans and specifications, and this work has been practically completed for the following units:

The Boysen Reservoir on the Big Horn River in Wyoming will store 820,000 acre-feet. A power plant at the dam will have an installed capacity of 15,000 kilowatts. The reservoir will provide flood control for lands along the Big Horn River and will afford immediate silt control. Stored water will be used as insurance for existing water rights on the Big Horn River in Wyoming and Montana and on the Yellowstone River below the mouth of the Big Horn when additional irrigation is developed in either or both basins. Contracts have been awarded for the erection of an engineer's camp and construction of a transmission line to supply power for construction. Bids have been opened for the reconstruction of 4½ miles of United States Highway 20.

The Owl Creek unit, in Wyoming, consists of the Anchor Reservoir, which will provide 14,500 acre-feet of storage, and the Lucerne pumping plant which will provide water by pumping from the Big Horn River, both to be used as supplemental water for 14,400 acres in the Owl Creek Valley now inadequately irrigated. Plans are complete.

The Angostura unit on the Cheyenne River in South Dakota will provide water for 16,000 acres to be served by gravity, and 25,000 acres to be served by pumps. Storage of 92,000 acre-feet will be provided by Angostura Reservoir which will also serve as a diversion dam. Bids for the construction of this dam have been opened.

The Tiber Dam on the Marias River in Montana will store 340,000 acre-feet and divert water for the irrigation of 120,000 acres on the north side of the Marias River. Plans and specifications for the Tiber Dam are nearly complete. Topographic surveys and land classification of project lands are under way.

Plans and specifications for the Canyon Ferry Dam on the Missouri River near Helena, Mont., are complete. The reservoir formed by this dam will have a capacity of 2,000,000 acre-feet. It will be used to insure protection for all water rights in the upper Missouri Basin, both above and below the reservoir when additional irrigation development is undertaken. A power plant of 36,000 kilowatt capacity will be provided.

Plans and specifications for the Heart Butte Dam on the Heart River in North Dakota are complete. The reservoir formed by this dam will provide storage of 300,000 acre-feet, of which 55,000 acre-feet will be available for the irrigation of 13,500 acres to be served partly by gravity and partly by pumping. Also included in the Heart River unit will be the Dickinson Reservoir, which will provide storage of 7,000 acre-feet, partly for municipal use at the town of Dickinson and partly for irrigation by pumping.

In addition to the above, plans and specifications are nearly completed for the Savage pumping unit in eastern Montana, which will serve 2,390 acres, and for the Square Butte and Wogansport pumping units along the Missouri River in North Dakota, to provide water for 3,500 acres.

Surveys and investigations.—During the fiscal year, surveys have been in active progress to obtain data for the preparation of plans and specifications for the Missouri-Souris unit, including the Cheyenne River Dam in Montana and North Dakota; the Hardin unit, including Yellowtail Dam, in Montana; the Grand River and Knife River units, and pumping units in North Dakota, and Paintrock unit in Wyoming.

Reconnaissance work has been in active progress at a number of points in the region, including the proposed diversion from Garrison Reservoir in North Dakota.

Contracts have been awarded to provide topographic maps to be used as a basis for further investigations of the Tongue, Clarks Fork, and Powder River Basins. Another contract covers aerial photography of irrigable lands in the Grand River Basin, N. Dak., Missouri-Souris unit, Montana and North Dakota, the Teton Basin in Montana, and Tongue and Powder River Basins in Montana and Wyoming. Rectified aerial photographs on a scale of 1 inch to 400 feet will be used as a basis for detailed land classifications and topographic surveys. Aerial topography has already been secured for the Yellowtail Reservoir site in the Big Horn River Canyon and for the canal line location between Tiber Reservoir and the project lands on the Lower Marais unit. Aerial photographs of the project lands under the Lower Marais unit have also been procured.

The Intake project, near Glendive, Mont., was constructed during the fiscal year and is being operated, for the first time, in 1946.

Deerfield Reservoir, the major feature of the Rapid Valley project, is practically complete. Water was being stored, at the end of the year, for supplemental supplies for lands irrigated in the Rapid Creek Valley, and to augment municipal supplies for Rapid City, S. Dak.

Contract was executed for the construction of Dodson pumping unit of the Milk River project. Repayment contract has been executed with the Dodson irrigation district, and the project will be completed in time for water delivery in 1947.

Contract was executed for the construction of the Big Flat unit, Missoula Valley project in the Columbia Basin unit, and will be completed for water delivery in 1947.

Contract has been executed for the construction of the Fallon unit of division No. 2 of the Buffalo Rapids project.

Surveys for the completion of the Riverton project in Wyoming have been in active progress. Two construction contracts have been executed and work under them is in active progress.

Surveys for the completion of the Heart Mountain division of the Shoshone project have also been under way. Two construction contracts have been executed. Preparations have been made for the opening to entry of 83 farm units of public land in fiscal year 1947. Plans and specifications for the construction of the Heart Mountain power plant on the Shoshone project have been completed.

On the Sun River project, the Pishkun siphon was completed.

On the Fort Peck project the 115-kilovolt transmission line from Fort Peck to Glendive was completed, and was energized on December 1, 1945.

Plans and specifications were completed for the 115-kilovolt transmission lines from Glendive to Miles City, Mont., and from Fort Peck, through Williston, N. Dak., to Garrison Dam in North Dakota. The portion from Williston to Garrison is considered a part of the Missouri Basin project.

On the projects constructed by this Bureau in region 6, farm operations in 1945 were generally successful and crop yields were good. Crops valued at $14,079,000 were produced on 360,000 acres. In addition, large numbers of livestock were produced and marketed. Production included 428,000 tons of sugar beets, or 6.5 percent of the Nation's total. Other major crop items included 502,000 bushels of beans; 550,000 bushels of potatoes, and 3,375,000 bushels of grains. A large part of the grain was fed to livestock locally.

The Fort Peck power plant is operated by the Corps of Engineers. The power generated is marketed by the Bureau of Reclamation. During fiscal year 1946 contracts for the sale of power to the following organizations were executed: Valley County Electric Cooperative near Whatley, Mont., 450 kilowatts; Mid-Yellowstone Electric Cooperative near Forsythe, Mont., 335 kilowatts; Montana-Dakota Utilities Co. for delivery of approximately 55 kilowatts, near Frazer and Oswego, Mont. A memorandum of understanding was executed with the Office of Indian Affairs for the use of certain transmission facilities under its jurisdiction and for delivery to the Indian Office of power required for irrigation pumping and other uses.

During the fiscal year, the Fort Peck, Shoshone and Riverton projects generated 172,241,000 kilowatt-hours of which 100,900,000 kilowatt-hours were generated on the Fort Peck project.

Housing shortages.—Housing shortages have been very severe throughout the region. Some Quonset huts and trailer houses have been obtained and put to use. Some construction buildings at a chrome mine have been obtained and dismantled and the material salvaged for use elsewhere. Four small housing units at the same mine have been obtained and plans have been made for dismantling them, moving them to regional headquarters, and reerecting them.

There has also been a serious shortage of many items of supplies and construction materials. In particular, construction work has been greatly retarded by lack of lumber and reinforcing steel.

Region 7

In region 7, comprising almost one-half of Wyoming, almost all of Nebraska, the north half of Kansas and that portion of Colorado east of the Continental Divide, 2 projects were in operation, 3 under construction, 7 under authorization and 25 in study status during the fiscal year ended June 30, 1946.

Following VJ-day, construction was greatly accelerated on the Colorado-Big Thompson project and during the year the 13.1-mile Alva B. Adams

Tunnel, under the Continental Divide, and Shadow Mountain Dam on the western slope of Colorado, were both completed. Work continued on the dikes for Granby Reservoir. In June, contracts totaling approximately $16,000,000 were awarded for the construction of Granby Dam and Horsetooth Reservoir—both important links in the Colorado-Big Thompson project.

The concrete lining of the Adams Tunnel was completed in February. Construction work on Rams Horn and Prospect Mountain Tunnels is ahead of schedule and bids have been announced for penstocks and for construction of the Estes Park and Marys Lake power plants.

Highlight of the construction year was the ground-breaking ceremony held May 15 at Kortes Dam site, when the Morrison-Knudsen Co., Boise, Idaho, began work on their $4,688,000 contract. Kortes Dam was the first unit of the entire Missouri Basin plan to reach construction stage.

The seven projects authorized but not yet under construction are all units of the Missouri Basin program and include: Frenchman-Cambridge unit, Nebraska, Bostwick unit, Nebraska-Kansas, Cedar Bluffs unit, Kansas, Kirwin unit, Kansas, Glendo unit, Wyoming, North Republican unit, Colorado-Kansas and the Wells unit, Kansas-Nebraska.

On the Frenchman-Cambridge unit the preconstruction work necessary for the preparation of final plans and specifications was completed on Enders Dam, Medicine Creek Dam, Cambridge Diversion Dam and the Cambridge-Oxford Canal.

On the Cedar Bluffs unit, foundation investigations were started on the Cedar Bluffs Dam.

On the Kirwin unit, preconstruction work necessary for the preparation for final plans and specifications for Kirwin Dam was completed.

Preconstruction work was begun on the Glendo Dam, Glendo unit, during the year as well.

River basin surveys.—During the year additional plans were developed for the Missouri River Basin as well as for the three major transmountain diversion projects.

All of the approved projects listed in Senate Document No. 191 have been subjected to further study and analysis to develop the most meritorious plan before requesting authorization.

Investigation of the Niobrara River Basin in northern Nebraska was initiated during the year. This basin survey will develop a plan for maximum use of the surplus waters in the basin which will be in excess of 500,000 acre-feet annually. The annual precipitation varies from 16 to 22 inches annually and there is an urgent need for power development in this area.

Basic data for the preparation of a report have been compiled for the Blue River-South Platte and Gunnison-Arkansas projects in Colorado. Project development and construction costs on these two projects alone will approach $800,000,000. The proposed projects will irrigate over 1,000,000 acres of land and will produce over 4,500,000,000 kilowatt-hours of electrical energy annually—sufficient practically to revolutionize existing Mountain States industries and create many new ones.

Transmountain diversion projects in Wyoming also are under investigation. New sources of water for the irrigable areas in the Saratoga-Encampment area and in the valley of the Sweetwater and Laramie Rivers. are being sought. Authorization of these projects will not be sought until the Upper Basin States have agreed on allocation of Colorado River water.

Ground water investigations.—Investigations of ground water resources have gained impetus during the last year. A closely knit cooperative program has been developed with the United States Coast and Geodetic Survey covering ground water possibilities in all potential pumping areas, and including stream gaging, chemical analysis and sediment studies throughout the region. Ground water supplies are recognized as an important factor in the future prosperity of our irrigated areas. Subterranean storage, timed recharging for pump requirements to augment or supplement surface supplies and continuing records of water tables for future operations are important elements in this program.

During the year the Kendrick project reached the operations stage. The first irrigation water flowed through the Casper Canal to unit No. 1 (a distance of 62 miles), on June 20. It is expected that 3,500 acres of new land will be brought under irrigation during the present year and ultimately 35,000 acres will be irrigated. The principal crops to receive water this year will be alfalfa and small grain.

Water rental notices were issued on the Mirage Flats project, northeast Nebraska, and it is expected that about 5,000 acres will receive water during the 1946 irrigation season.

This year also witnessed the growth of region 7's power load. During the war the interconnected power system of Colorado-Nebraska and Wyoming served a number of war emergency loads but after VJ-day these, of course, fell off. By February 1946, power requirements of the system had exceeded those of the previous year, thereby wiping out all war-load losses.

REA cooperatives continued to receive electric energy from the Bureau particularly for irrigation pumping. In southeast Wyoming and northeast Colorado, crop production was greatly increased during the usual critical times.

Funds were approved by Congress during the year for the extension of the Bureau's transmission system into eastern Colorado where electrical energy will be made available for additional irrigation pumping and for an expansion of the productive area in that part of the State.

In the fiscal year just completed the four hydro-power plants of region 7 generated 235,700,000 kilowatt-hours of electricity, which is a 27 percent increase over the previous year. Some 30,000,000 kilowatt-hours were purchased by region 7. There were 236,800,000 kilowatt-hours of energy sold to municipalities, REA cooperatives, industrial plants, army camps and public utilities for a gross revenue of $1,582,000—also an increase of 27 percent over the previous year.

Organization

Although reorganization of the Bureau was set in motion in September 1943 to prepare for the vastly expanded activities foreseen with the war's end, many of the administrative improvements contemplated in the reorganization plans were necessarily suspended because of lack of staff and because many of the planned improvements were geared to and dependent upon the anticipated expansion of the Bureau's program. With Congress' complete endorsement in August 1945 of the reorganization plan, the cessation of hostilities was the signal for application of the long-held plans.

The plans placed into effect provided for the administrative consolidation of all field activities into seven regions. Operating policies and practices required complete reshaping so as to provide for the assumption of major administrative responsibilities by the seven regional offices. The Office of Management Planning was the administrative facility used to provide the necessary technical guidance and assistance in all phases of the wholesale reorganization.

Comprehensive Manual of Instructions

The termination of the war also enabled the Office of Management Planning to recruit promptly a small staff to guide and assist the branches and offices of the Bureau in the preparation of a long-needed comprehensive manual of rules, regulations, and operating procedures. Such a manual was foreseen as especially necessary to facilitate the indoctrination and training of a greatly expanded Bureau staff. Several of the handbooks of the manual system were completed during the fiscal year, and the schedule calls for completion of the balance of the handbooks early in fiscal year 1947. The manual is designed to set forth the legislative enactments governing the Bureau's program, Department and Bureau policies, and administrative procedures for the effective and efficient performance of the Bureau's responsibilities. In addition, the handbooks of the manual will set forth the standards and requirements of the Bureau's highly technical undertakings in the fields of engineering, economics, water utilization and electric power generation and transmission.

Administrative Examinations

During the fiscal year the administrative examiners of the Office of Management Planning completed administrative surveys of five of the Bureau's seven regional offices. The administrative examinations completed have been very fruitful in bringing to the fore the administrative problems and requirements of the regions surveyed, thus facilitating the administrative action required to resolve existing problems and make provision for administrative requirements developing along with expanded program activities.

Decentralization and Consolidations

Search for improved administrative efficiency and effectiveness lead to studies of needs for decentralization of authority and responsibility and for consolidation of duplicated phases in related field activities. These studies resulted in consolidation of project and other field activities in homogenous geographical areas where such consolidations result in more economical and effective performance of Bureau work and enable further decentralization of authority and responsibility. The facility for effecting such consolidations and providing for further delegations of authority and responsibility is termed a district organization. District organizations were established during the fiscal year in regions 1, 2, 3, and 7.

Establishment of Uniform Regional Staffs

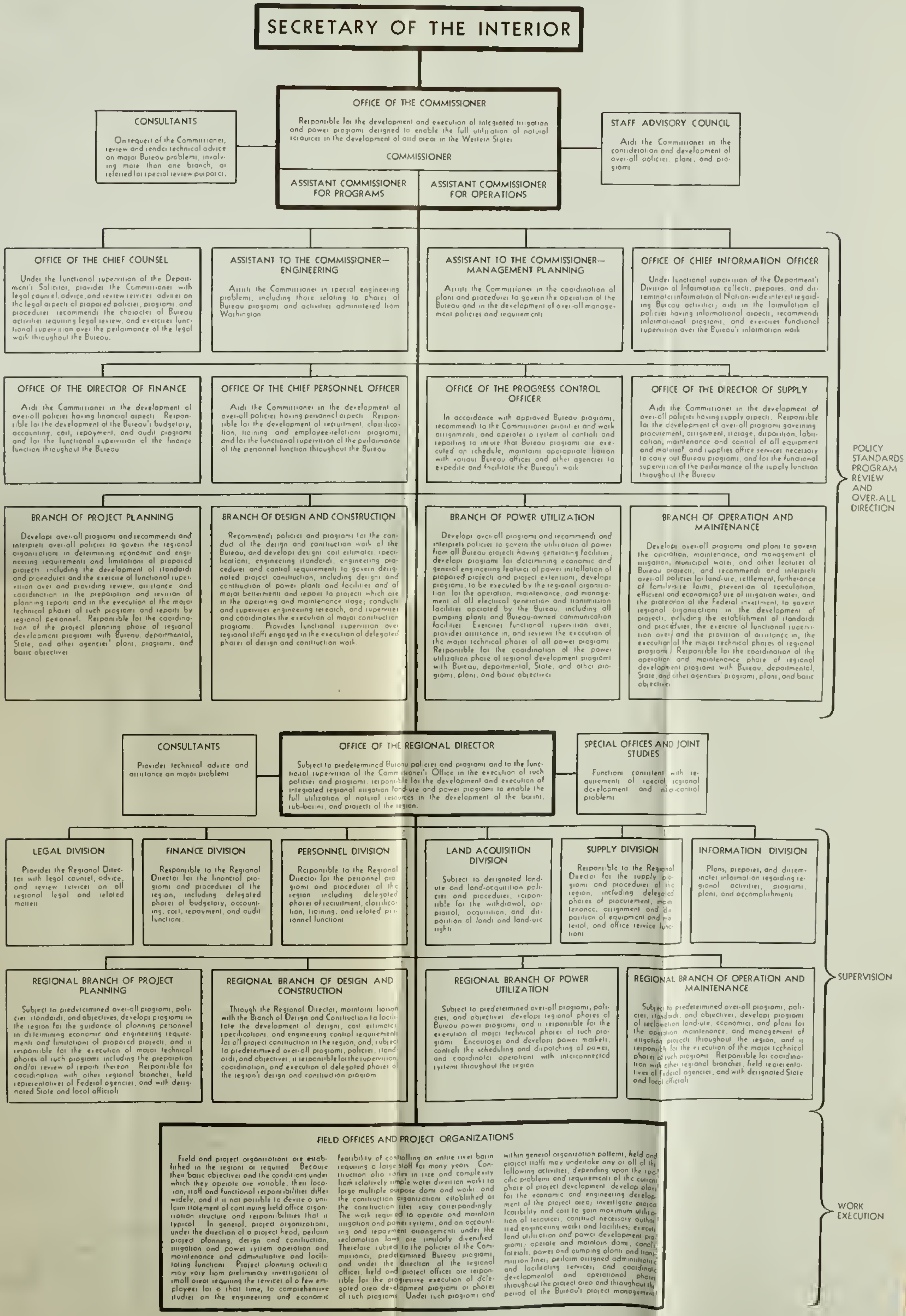
Establishment of uniform staffs for the regional offices in order to facilitate the performance of regional office responsibilities and the exercise of necessary controls by the Commissioner came about during the fiscal year. A major part of this establishment was the preparation of standard job descriptions for the authorized positions.

Program and Progress Charting

To direct the scheduling of work programs, operate controls, and institute reporting procedures for measurement and evaluation of progress, an Office of Progress Control has been established this year. The new office provides current reports on work progress and on any conditions delaying scheduled performance. By directing the attention of the staff offices to the reported needs of the field offices, the office aids in coordinating and facilitating the work of the Bureau. In administering procedures for scheduling and reporting, the Chief Progress Control Officer exercises functional direction over all the progress control units in the regional offices.

Shortly after the office was established and before it was fully staffed, it was faced with the problem of obtaining work schedules for the second half of the fiscal year for the enlarged program of work made possible by the funds appropriated by the First Deficiency Act of 1946. In accordance with procedures outlined by the Office of Progress Control, the proj-

MASTER ORGANIZATION CHART, UNITED STATES DEPARTMENT OF THE INTERIOR, BUREAU OF RECLAMATION



SECRETARY OF THE INTERIOR

OFFICE OF THE COMMISSIONER

Responsible for the development and execution of integrated irrigation and power programs designed to enable the full utilization of natural resources in the development of arid areas in the Western States

COMMISSIONER

ASSISTANT COMMISSIONER FOR PROGRAMS

ASSISTANT COMMISSIONER FOR OPERATIONS

CONSULTANTS

On request of the Commissioner, review and render technical advice on major Bureau problems, involving more than one branch, or referred for special review purposes.

STAFF ADVISORY COUNCIL

Aids the Commissioner in the consideration and development of over-all policies, plans, and programs

OFFICE OF THE CHIEF COUNSEL

Under the functional supervision of the Department's Solicitor, provides the Commissioner with legal counsel, advice, and review services advises on the legal aspects of proposed policies, programs, and procedures recommends the character of Bureau activities requiring legal review, and exercises functional supervision over the performance of the legal work throughout the Bureau.

ASSISTANT TO THE COMMISSIONER—ENGINEERING

Assists the Commissioner in special engineering problems, including those relating to phases of Bureau programs and activities administered from Washington

ASSISTANT TO THE COMMISSIONER—MANAGEMENT PLANNING

Assists the Commissioner in the coordination of plans and procedures to govern the operation of the Bureau and in the development of over-all management policies and requirements

OFFICE OF CHIEF INFORMATION OFFICER

Under functional supervision of the Department's Division of Information collects, prepares, and disseminates information of Nation-wide interest regarding Bureau activities; aids in the formulation of policies having informational aspects, recommends informational programs, and exercises functional supervision over the Bureau's information work

OFFICE OF THE DIRECTOR OF FINANCE

Aids the Commissioner in the development of over-all policies having financial aspects Responsible for the development of the Bureau's budgetary, accounting, cost, repayment, and audit programs and for the functional supervision of the finance function throughout the Bureau

OFFICE OF THE CHIEF PERSONNEL OFFICER

Aids the Commissioner in the development of over-all policies having personnel aspects Responsible for the development of recruitment, classification, training and employee-relations programs, and for the functional supervision of the performance of the personnel function throughout the Bureau

OFFICE OF THE PROGRESS CONTROL OFFICER

In accordance with approved Bureau programs, recommends to the Commissioner priorities and work assignments, and operates a system of controls and reporting to insure that Bureau programs are executed on schedule, maintains appropriate liaison with various Bureau offices and other agencies to expedite and facilitate the Bureau's work

OFFICE OF THE DIRECTOR OF SUPPLY

Aids the Commissioner in the development of over-all policies having supply aspects. Responsible for the development of over-all programs governing procurement, assignment, storage, disposition, fabrication, maintenance and control of all equipment and material, and supplies office services necessary to carry out Bureau programs, and for the functional supervision of the performance of the supply function throughout the Bureau

BRANCH OF PROJECT PLANNING

Develops over-all programs and recommends and interprets over-all policies to govern the regional organizations in determining economic and engineering requirements and limitations of proposed projects including the development of standards and procedures and the exercise of functional supervision over and providing review, assistance and coordination in the preparation and revision of planning reports and in the execution of the major technical phases of such programs and reports by regional personnel. Responsible for the coordination of the project planning phase of regional development programs with Bureau, departmental, State, and other agencies' plans, programs, and basic objectives

BRANCH OF DESIGN AND CONSTRUCTION

Recommends policies and programs for the conduct of the design and construction work of the Bureau, and develops designs cost estimates, specifications, engineering standards, engineering procedures and control requirements to govern designated project construction, including designs and construction of power plants and facilities and of major betterments and repairs to projects which are in the operating and maintenance stage; conducts and supervises engineering research, and supervises and coordinates the execution of major construction programs. Provides functional supervision over regional staffs engaged in the execution of delegated phases of design and construction work.

BRANCH OF POWER UTILIZATION

Develops over-all programs and recommends and interprets policies to govern the utilization of power from all Bureau projects having generating facilities, develops programs for determining economic and general engineering features of power installation of proposed projects and project extensions, develops programs, to be executed by the regional organization for the operation, maintenance, and management of all electrical generation and transmission facilities operated by the Bureau, including all pumping plants and Bureau-owned communication facilities Exercises functional supervision over, provides assistance in, and reviews the execution of the major technical phases of all power programs Responsible for the coordination of the power utilization phase of regional development programs with Bureau, departmental, State, and other programs, plans, and basic objectives

BRANCH OF OPERATION AND MAINTENANCE

Develops over-all programs and plans to govern the operation, maintenance, and management of irrigation, municipal water, and other features of Bureau projects, and recommends and interprets over-all policies for land-use, settlement, furtherance of family-size farms, prevention of speculation, efficient and economical use of irrigation water, and the protection of the Federal investment, to govern regional organizations in the development of projects, including the establishment of standards and procedures, the exercise of functional supervision over and the provision of assistance in, the execution of the major technical phases of regional programs. Responsible for the coordination of the operation and maintenance phase of regional development programs with Bureau, departmental, State and other agencies' programs, plans, and basic objectives

POLICY STANDARDS PROGRAM REVIEW AND OVER-ALL DIRECTION

OFFICE OF THE REGIONAL DIRECTOR

Subject to predetermined Bureau policies and programs and to the functional supervision of the Commissioner's Office in the execution of such policies and programs, responsible for the development and execution of integrated regional irrigation land-use and power programs to enable the full utilization of natural resources in the development of the basins, sub-basins, and projects of the region.

CONSULTANTS

Provides technical advice and assistance on major problems

SPECIAL OFFICES AND JOINT STUDIES

Functions consistent with requirements of special regional development and river-control problems

LEGAL DIVISION

Provides the Regional Director with legal counsel, advice, and review services on all regional legal and related matters

FINANCE DIVISION

Responsible to the Regional Director for the financial programs and procedures of the region, including delegated phases of budgetary, accounting, cost, repayment, and audit functions.

PERSONNEL DIVISION

Responsible to the Regional Director for the personnel programs and procedures of the region including delegated phases of recruitment, classification, training, and related personnel functions

LAND ACQUISITION DIVISION

Subject to designated land-use and land-acquisition policies and procedures, responsible for the withdrawal, appraisal, acquisition, and disposition of lands and land-use rights

SUPPLY DIVISION

Responsible to the Regional Director for the supply programs and procedures of the region, including delegated phases of procurement, maintenance, assignment and disposition of equipment and material, and office service functions

INFORMATION DIVISION

Plans, prepares, and disseminates information regarding regional activities, programs, plans, and accomplishments

REGIONAL BRANCH OF PROJECT PLANNING

Subject to predetermined over-all programs, policies standards, and objectives, develops programs in the region for the guidance of planning personnel in determining economic and engineering requirements and limitations of proposed projects, and is responsible for the execution of major technical phases of such programs including the preparation and/or review of reports thereon Responsible for coordination with other regional branches, field representatives of Federal agencies, and with designated State and local officials

REGIONAL BRANCH OF DESIGN AND CONSTRUCTION

Through the Regional Director, maintains liaison with the Branch of Design and Construction to facilitate the development of designs, cost estimates specifications, and engineering control requirements for all project construction in the region, and, subject to predetermined over-all programs, policies, standards, and objectives, is responsible for the supervision, coordination, and execution of delegated phases of the region's design and construction program

REGIONAL BRANCH OF POWER UTILIZATION

Subject to predetermined over-all programs, policies, and objectives develops regional phases of Bureau power programs, and is responsible for the execution of major technical phases of such programs Encourages and develops power markets, controls the scheduling and dispatching of power, and coordinates operations with interconnected systems throughout the region

REGIONAL BRANCH OF OPERATION AND MAINTENANCE

Subject to predetermined over-all programs, policies, standards, and objectives, develops programs of reclamation land-use, economics, and plans for the operation maintenance, and management of irrigation projects throughout the region, and is responsible for the execution of the major technical phases of such programs Responsible for coordination with other regional branches, field representatives of Federal agencies, and with designated State and local officials

SUPERVISION

FIELD OFFICES AND PROJECT ORGANIZATIONS

Field and project organizations are established in the regions as required Because their basic objectives and the conditions under which they operate are variable, their location, staff and functional responsibilities differ widely, and it is not possible to devise a uniform statement of continuing field office organization structure and responsibilities that is typical In general, project organizations, under the direction of a project head, perform project planning, design and construction, irrigation and power system operation and maintenance and administrative and facilitating functions Project planning activities may vary from preliminary investigations of small areas requiring the services of a few employees for a short time, to comprehensive studies on the engineering and economic feasibility of controlling an entire river basin requiring a large staff for many years Construction also varies in size and complexity from relatively simple water diversion works to large multiple purpose dams and works, and the construction organizations established or the construction sites vary correspondingly The work required to operate and maintain irrigation and power systems, and on accounting and repayment arrangements under the reclamation laws are similarly diversified Therefore subject to the policies of the Commissioner, predetermined Bureau programs, and under the direction of the regional offices, field and project offices are responsible for the progressive execution of delegated area development programs or phases of such programs Under such programs and within general organization patterns, field and project staffs may undertake any or all of the following activities, depending upon the specific problems and requirements of the current phase of project development develop plans for the economic and engineering development of the project area; investigate project feasibility and cost to gain maximum utilization of resources, construct necessary authorized engineering works and facilities; execute land utilization and power development programs; operate and maintain dams, canals, laterals, power and pumping plants and transmission lines; perform assigned administrative and facilitating services; and coordinate developmental and operational phases throughout the project area and throughout the period of the Bureau's project management

WORK EXECUTION

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ect work programs were proposed by the regional directors, reviewed and coordinated by the staff officers, approved by the Commissioner, and issued as the Commissioner's Program, January–June 1946. This advance planning has been invaluable in promoting expeditious and efficient accomplishment of all phases of the Bureau's work connected with the construction program. To assure timely achievement of long-range objectives, all basic project programs are being revised, taking into consideration the results of the January–June work program just completed and the funds appropriated for fiscal year 1947. When the revised basic programs are approved, the detailed work schedules for each operating office during 1947 will be developed.

The operation of progress control is a new function for the Bureau. As emphasis was placed first upon work, scheduling progress reporting procedures have had to be geared directly to the work schedules as they were established. A reporting procedure has been instituted to indicate periodically the status of performance on the construction program as well as the outlook for future accomplishment. The outlook report enables the various offices to adjust their operations to the coming work load. A status report of progress on the Bureau programs has been developed and four issues have been prepared measuring accomplishment in comparison with the amount of work scheduled. This report currently covers the programs of construction, project planning, and personnel recruitment and indicates the status of funds, invitations issued, awards of contracts, and the procurement of supplies. Detailed narrative reports of regional office activities are summarized and matters requiring attention are referred to the offices concerned.

Field Procedures Survey

Study was made during the year of the field reporting procedures and a survey was conducted to determine upon a system that would contribute the maximum information with the least burden upon the operating field offices. The reporting procedures will be coordinated with the developments in work scheduling and programming, and expanded to measure periodic progress on the basis of physical completion, cost, and time. Accurate and comprehensive progress reporting and analysis becomes increasingly important as the work of the Bureau increases in volume and in scope.

Financial Operation and Control

At the end of the 1946 fiscal year the total investment of the Federal Government in projects constructed by the Bureau of Reclamation amounted to $993,056,468, an increase of $40,162,926 over the previous year.

TABLE 5.—*Consolidated statement by projects of construction cost of irrigation and power works, other items reimbursable with construction, and deductions*

State and project	Construction cost		Operation and maintenance before public notice (net)		Operation and maintenance deficits, arrearages, and penalties		Construction revenues, contributed funds, and nonreimbursable appropriations (contra)		Abandoned works, nonreimbursable cost and authorized charge-offs	Net balance	
	Fiscal year 1946	To June 30, 1946	Fiscal year 1946	To June 30, 1946	Fiscal year 1946	To June 30, 1946	Fiscal year 1946	To June 30, 1946		Fiscal year 1946	To June 30, 1946
Arizona:											
Gila	$856,755.76	$8,564,919.63	[1] $15,092.74	[1] $32,411.24			[1] $218,351.70	[1] $311,287.30		$1,060,014.72	$8,843,795.69
Salt River		20,244,688.48		115,993.50		$866,573.92		3,200,814.81	$382,097.31		17,644,343.78
Yuma Auxiliary		902,060.50				590.36	112.13	2,251.00		[1] 112.13	900,399.86
Arizona-California: Yuma		9,373,406.10		388,934.62	[1] $0.04	210,434.05	2,871.89	301,498.06		[1] 2,871.93	9,671,276.71
California:											
Central Valley	4,204,949.71	163,186,067.00	[1] 29,082.69	40,368.78			13,638.16	365,213.13		4,162,228.86	162,861,222.65
Orland		2,448,669.71		[1] 11,432.99	233.38	62,634.63		28,414.77		233.38	2,471,456.58
Colorado:											
Colorado-Big Thompson	4,897,387.37	26,387,750.83					954,603.65	1,112,102.01		3,942,783.72	25,275,648.82
Fruitgrowers Reservoir		200,740.71						2,500.00			198,240.71
Grand Valley	60.32	5,095,621.98		138,621.28		4,529.40	6,224.35	275,937.18	812,374.64	[1] 6,164.03	4,150,460.84
Paonia	178.15	56,681.30								178.15	56,681.30
Pine River	[1] 296.04	3,329,532.28		1,695.72		2,519.44	90.00	2,319.77		[1] 386.04	3,331,427.67
San Luis Valley	79,465.81	310,315.45								79,465.81	310,315.45
Uncompahgre		8,976,443.18		311,103.02	[1] 135.11	196,368.80	20.00	25,601.42	[2] 1,261,956.28	[1] [2] 1,319.46	8,196,357.30
Idaho:											
Boise		16,035,747.35		422,283.48		903,699.42	54,080.93	1,348,651.53	82,393.84	[1] 54,080.93	15,930,684.88
Boise-Anderson Ranch	5,479,431.06	15,611,216.10					4,636.19	13,998.37		5,474,794.87	15,597,217.73
Boise-Payette	99,700.61	4,930,502.20	[1] 10,477.19	11,589.77			734.55	3,614.53		88,488.87	4,938,477.44
King Hill		1,905,918.80				110,122.51		28,187.27	1,987,854.04		
Minidoka	1,905.36	22,717,999.24	[1] 379.58	315,719.59		644,440.26	42,957.05	2,207,869.91	2,288.15	[1] 41,431.27	21,468,001.03
Palisades	186,798.56	217,053.84								186,798.56	217,053.84
Kansas: Garden City		342,963.68		52,868.10				61,356.82	334,474.96		
Montana:											
Bitter Root		947,641.05				516,637.95					1,464,279.00
Frenchtown		273,603.11		5,496.26							279,099.37
Hungry Horse	161,571.66	161,571.66								161,571.66	161,571.66
Huntley		1,559,590.46		[1] 1,000.16		391,067.46	8,604.57	35,441.58	62,049.83	[1] 8,604.57	1,852,166.35
Milk River	35.76	8,673,406.88	[1] 71.57	436,505.82		101,062.03	463.50	124,261.96	1,735,969.31	[1] 499.31	7,350,743.46
Sun River	104,781.46	9,751,509.35		133,102.38		103,137.65		48,555.64	89,650.57	104,781.46	9,849,543.17
Montana-North Dakota: Lower Yellowstone		3,685,433.14	[1] 1,697.42	[1] 1,697.42		922,893.29	998.44	130,719.25	382,254.00	[1] 2,695.86	4,093,655.76
Nebraska-Wyoming: North Platte		19,551,148.27		743,294.42		1,516,486.08	1,554.01	851,393.84		[1] 1,554.01	20,959,534.93

Nevada:											
Humboldt		1,293,741.14		21,020.51			119,466.07	123,772.73		[1] 119,466.07	1,190,988.92
Newlands		7,947,282.86		[1] 2,155.44		44,976.32		52,347.53	4,437,820.00		3,499,936.21
Truckee Storage		1,093,328.31		9,926.48			50.00	22,048.30		[1] 50.00	1,081,206.49
New Mexico:											
Carlsbad	5,180.00	3,990,096.44		[1] 17,751.77		93,395.50		30,094.22	374,883.58	5,180.00	3,660,762.37
Hondo		339,491.68		32,952.01				656.03	371,787.66		
Tucumcari	2,010,500.28	9,304,470.35	14,405.25	14,405.25						2,024,905.53	9,318,875.60
New Mexico-Texas: Rio Grande	338,936.35	20,833,336.61		15,771.13		364,531.65	1,557,220.75	4,734,148.12	357,841.20	[1] 1,218,284.40	16,121,650.07
North Dakota:											
Buford-Trenton		223,423.06		[1] 31.75				1,967.62	221,423.69		
Williston		517,630.09		[1] 165.00				108,370.40	409,094.69		
Oklahoma: Altus	1,085,236.24	6,627,221.69					6,750.00	1,136,750.00		1,078,486.24	5,490,471.69
Oregon:											
Baker		281,591.64						5,003.00			276,588.64
Burnt River		601,025.82						1,290.82			599,735.00
Deschutes	1,642,365.22	5,472,932.76		2,294.13						1,642,365.22	5,475,226.89
Umatilla		5,237,828.06			[1] 419.63	230,117.15	2,025.41	107,020.07	888,340.82	[1] 2,445.04	4,472,584.32
Vale	3,057.87	4,858,971.22		39,773.56		3,027.24	1,037.20	23,442.69		2,020.67	4,878,329.33
Oregon-California: Klamath	414,427.63	7,880,612.04	[1] 278.13	100,726.12		85,433.09	555,820.17	2,125,782.17	7,499.72	[1] 141,670.67	5,933,489.36
Oregon-Idaho: Owyhee	49,820.55	18,188,279.91			[1] 52,688.07	259,076.52	1,828.77	20,612.48		[1] 4,696.29	18,426,743.95
South Dakota: Belle Fourche		4,630,391.88		[1] 1,989.03		676,577.53		29,042.05	379,031.58		4,896,906.75
Texas: Valley Gravity Canal and Storage	244,974.35	521,867.41								244,974.35	521,867.41
Utah:											
Hyrum		941,884.54						11,884.54			930,000.00
Moon Lake		1,600,360.94						8,093.18			1,592,267.76
Ogden River	1,206.99	4,379,795.73		2,361.87				12,886.97		1,206.99	4,369,270.63
Provo River	1,366,719.74	11,185,640.81	[1] 25,888.68	[1] 16,069.33			1,645.50	32,543.17		1,339,185.56	11,137,028.31
Salt Lake Basin		2,725,885.40				5,897.20	40.00	46,385.77		[1] 40.00	2,685,396.83
Sanpete		374,540.34						1,284.40			373,255.94
Strawberry Valley		3,507,423.49		10,744.06		89,635.49		258,379.12			3,349,423.92
Washington:											
Okanogan		1,452,129.45		[1] 47,766.87		26,882.64		7,496.28	997,861.70		425,887.24
Yakima		26,346,976.81	86,328.75	21,971.67		150,166.74	54,126.97	785,842.42	4,214.60	32,201.78	25,729,058.20
Yakima-Roza	422,591.82	11,792,008.43	[1] 21,971.49	44,249.21			178.30	1,735.40		400,442.03	11,834,522.24
Wyoming:											
Kendrick	11,401.59	18,138,762.57	24,040.02	124,247.27			1,733,084.78	1,744,627.63		[1] 1,697,643.17	16,518,382.21
Riverton	131,907.70	6,445,971.23			[1] 18,184.40	101,965.04	1,183.95	31,927.51		112,539.35	6,516,008.76
Shoshone	3,021.71	10,497,541.23	[1] 2,105.44	27,550.01		467,235.44	148,468.30	1,485,615.86	1,545,129.47	[1] 147,552.03	7,961,581.35
Shoshone-Heart Mountain	68,046.19	4,429,800.75	10,248.21	30,243.81						78,294.40	4,460,044.56
Total	23 872,119.78	559,104,446.97	27,977.30	3,483,342.83	[1] 71,193.87	9,152,114.80	5,056,163.89	22,810,466.03	17,128,291.64	18,771,574.97	531,801,146.93

See footnotes at end of table, p. 115.

TABLE 5.—*Consolidated statement by projects of construction cost of irrigation and power works, other items reimbursable with construction, and deductions*—Con.

WATER CONSERVATION AND UTILITY PROJECTS

State and project	Construction cost		Operation and maintenance during construction		Construction revenues [1]		Net construction cost	
	Fiscal year 1946	To June 30, 1946	Fiscal year 1946	To June 30, 1946	Fiscal year 1946	To June 30, 1946	Fiscal year 1946	To June 30, 1946
Colorado: Mancos	$169,272.91	$748,325.50					$169,272.91	$748,325.50
Idaho:								
Mann Creek		32,836.75				$267.47		32,569.28
Rathdrum Prairie	227,111.12	349,313,78	$892.31	$892.31	[1]$2.00	5.00	228,005.43	350,201.09
Montana:								
Bitterroot	22,558.02	86,580.83					22,558.02	86,580.83
Buffalo Rapids, first division	5,239.83	2,004,361.40		39,695.81		665.07	5,239.83	2,043,392.14
Buffalo Rapids, second division	109,573.30	1,440,094.05	16,587.26	31,928.94			126,160.56	1,472,022.99
Intake	62,497.81	68,166.78	1,250.34	1,250.34			63,748.15	69,417.12
Milk River, Dodson	41,687.79	45,764.99					41,687.79	45,764.99
Missoula Valley	92,764.58	114,797.85					92,764.58	114,797.85
Saco Divide	[1]22.00	2,477.97					[1]22.00	2,477.97
Nebraska: Mirage Flats	1,010,677.85	2,569,251.60	[1]3,000.00	3,000.00	[1]1,100.00	495.00	1,008,777.85	2,565,756.60
North Dakota: Buford-Trenton		945,858.84						945,858.84
South Dakota:								
Angostura		43,484.62						43,484.62
Rapid Valley	135,589.48	761,693.85			186.16	1,702.44	135,403.32	759,991.41
Texas: Balmorhea	13,123.66	29,821.05					13,123.66	29,821.05
Utah:								
Newton	65,427.24	534,207.28					65,427.24	534,207.28
Scofield	464,017.02	806,171.56					464,017.02	806,171.56
Wyoming: Eden	40,414.49	392,104.41					40,414.49	392,104.41
Total	2,459,933.10	10,975,313.11	15,729.91	70,767.40	[1]915.84	3,134.98	2,476,578.85	11,042,945.53

SPECIAL PROJECTS

State and project	Construction cost		Contributions		Net balance	
	Fiscal year 1946	To June 30, 1946	Fiscal year 1946	To June 30, 1946	Fiscal year 1946	To June 30, 1946
Colorado River Dam fund:						
All-American Canal	$3,960,840.29	$36,193,804.53	$20,000.00	$20,000.00	$3,940,840.29	$36,173,804.53
Boulder Canyon	1,771,192.39	144,158,697.68	70,149.97	70,149.97	1,701,042.42	144,088,547.71
Arizona:						
Davis Dam	2,407,265.04	5,907,120.81			2,407,265.04	5,907,120.81
Parker Dam		6,821,853.10		6,821,853.10		
Parker Power	332,457.99	15,520,645.34			332,457.99	15,520.645.34
Montana: Fort Peck	165,857.71	810,607.63			165,857.71	810,607.63
Texas: Colorado River	124,242.93	23,869,183.17	9,580.75	9,580.75	114,662.18	23,859,602.42
Washington: Columbia Basin	5,069,016.83	189,694,795.86	5,181,658.23	5,181,658.23	[1] 112,641.40	184,513,137.63
Total	13,830,873.18	422,976,708.12	5,281,388.95	12,103,242.05	8,549,484.23	410,873,466.07
Grand total	40,162,926.06	993,056,468.20				

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[1] Contra.

[2] Includes $1,164.35 authorized charge-offs applicable to fiscal year 1946.

Operations of Reclamation Fund

During its 44 years of operation accretions to the Reclamation fund have totaled $233,480,443. These have come from the sale of public lands, proceeds from the Oil Leasing Act, from Federal water power licenses, potassium royalties and rentals, and receipts from naval petroleum reserves from 1920 to 1930 under the act of May 9, 1938.

TABLE 6.—*Accretions to Reclamation fund by States*

State	Sale of public lands		Proceeds from Oil Leasing Act		Total to June 30, 1946
	Fiscal year 1946	To June 30, 1946	Fiscal year 1946	To June 30, 1946	
Alabama			$659.24	$198,295.02	$198,295.02
Arizona	$11,243.39	$2,777,582.75	2,833.69	12,128.16	2,789,710.91
Arkansas				886.47	886.47
California	30,133.18	8,334,200.72	1,539,779.07	26,526,608.23	34,860,808.95
Colorado	8,168.63	10,334,498.83	320,693.64	1,764,465.29	12,098,964.12
Florida			10.50	10.50	10.50
Idaho	5,891.43	7,063,989.01	328.31	23,230.15	7,087,219.16
Kansas	965.72	1,034,567.12	5,873.55	56,541.49	1,091,108.61
Louisiana			7,424.35	363,056.43	363,056.43
Michigan			1,902.11	4,292.46	4,292.46
Mississippi			113.66	345.97	345.97
Montana	9,288.97	15,397,913.87	269,221.14	2,631,783.38	18,029,697.25
Nebraska	2,109.14	2,099,807.84		446.25	2,100,254.09
Nevada	2,177.46	1,044,523.36	5,132.26	29,493.27	1,074,016.63
New Mexico	17,652.46	6,760,462.76	758,317.83	6,668,312.70	13,428,775.46
North Dakota	470.86	12,220,117.13	16,119.86	319,616.31	12,539,733.44
Oklahoma	882.32	5,932,027.90	3,117.14	16,298.30	5,948,326.20
Oregon	2,834.24	11,998,158.97	1,420.53	3,370.57	12,001,529.54
South Dakota	925.55	7,734,601.03	3,142.28	33,245.55	7,767,846.58
Utah	3,375.44	4,400,914.92	145,680.92	1,637,359.64	6,038,274.56
Washington	5,904.61	7,481,006.83	1,840.87	47,956.95	7,528,963.78
Wyoming	15,836.67	8,737,917.22	1,714,713.59	46,455,757.32	55,193,674.54
Total	117,860.07	113,352,290.26	4,798,324.54	86,793,500.41	200,145,790.67
Proceeds, Federal water power licenses					[1] 1,031,757.60
Proceeds, potassium royalties and rentals					[2] 2,522,872.24
Receipts from naval petroleum reserves, 1920–38, act of May 9, 1938					29,778,300.23
Proceeds from right-of-way over withdrawn lands, act of July 19, 1919					1,722.64
Grand total					233,480,443.38

[1] Proceeds for fiscal year, $34,944.75.

[2] Proceeds for fiscal year, $420,677.90.

Collections.—Construction and operation, and maintenance repayments, water rentals, power revenues, etc., have totaled $195,484,979.

Disbursements during that period have totaled $381,070,315, leaving a balance in the fund on June 30, 1946, of $47,895,107. Repayments of construction charges to the Reclamation fund during the fiscal year 1946 totaled $2,951,839. Operation and maintenance collections totaled $1,653,809, of which $397,957 accrued to the Reclamation fund. Receipts from water rentals, power sales, and other sources aggregated $18,938,730, more than twice the receipts for the previous fiscal year.

Decentralization of Accounting

During the fiscal year the Director of Finance authorized a study of the Bureau of Reclamation accounting system and procedure with a view of streamlining the accounting and developing procedure for current reporting. At the close of this fiscal year an improved plan of control has been devised, and the entire accounting is being decentralized into regional offices, with cash control being maintained in the Washington office. The plan of decentralization of the accounting should result in a more effective control and current reporting for all projects within each region. This plan will also facilitate the preparation of consolidated reports on a monthly basis, so that the financial position will be currently available for individual projects as well as the over-all operations of the Bureau.

Reclamation Legislation

With the close of the fiscal year 1946, proposed legislation of far-reaching significance to Reclamation was pending before the Seventy-ninth Congress. Proposed legislation included House bills 520 and 5124. House bill 520 would "facilitate settlement of returning veterans on farms in projects constructed, operated, and maintained by the Bureau of Reclamation." Extensive hearings were held by the House Committee on Irrigation and Reclamation on House bill 5124, a bill "Relating to the sale of electric power and power privileges under the Reclamation Project Act of 1939." Former Secretary Ickes recommended enactment of the bill with certain amendments. One of the amendments would authorize the Secretary of the Interior, whenever opportunities arise in connection with Federal reclamation projects, to improve conditions for fish and wildlife and to provide recreational facilities on a nonreimbursable basis. The Solicitor of the Department, the Commissioner of Reclamation, the Director of the Fish and Wildlife Service, and the Associate Director of the National Park Service appeared before the Committee.

The act of July 14, 1945 (Public Law 143, 79th Cong., 1st sess.), authorized the Secretary of the Interior to execute a contract between the United States and the Truckee-Carson irrigation district. This contract authorized the payment of the deficit of the district from funds received from water rights sold after January 1, 1942.

An amendment (act of Mar. 6, 1946, 60 Stat. 36) to section 9 of the Boulder Canyon Project Act (45 Stat. 1057) renewed and extended to veterans of World War I, the Spanish-American War, and veterans of the insurrection in the Philippines, the veterans' preference in connection with the opening of public lands to homestead entry on lands watered from the Gila Canal in Arizona and the All-American Canal in California. The act also extended the same preference to veterans of World War II.

The act of June 25, 1946 (Public Law 440, 79th Cong., 2d sess.), amended the act of September 27, 1944 (58 Stat. 747), entitled "An act to allow credit in connection with certain homestead entries for military or naval service rendered during World War II." This amendment extended the benefits of the original act to persons under the age of 21 years who were otherwise qualified.

President Truman signed the War Department Civil Functions Appropriation Act, 1947, on May 2, 1946. On May 3, he issued a statement saying he was "glad to note that the Congress, by the addition of certain provisos to the item for the Kings River project, California, has afforded an opportunity for reassuring that the Federal Reclamation policy, including repayment and the wide distribution of benefits, will apply to that project." The President further added that in the near future he planned to send to the Congress his recommendations regarding an over-all plan for the development of the water resources of the Central Valley area in California. In the meantime, President Truman instructed the Director of the Budget to impound the funds appropriated for the construction of the Kings River project, California, pending determination of the allocation of costs and the making of the necessary repayment arrangements.

The Congress approved an interstate compact between the States of Colorado and New Mexico with respect to the waters of the Costilla Creek (act of June 11, 1946, Public Law 408, 79th Cong., 2d sess.).

Public Law 439, Seventy-ninth Congress, second session, authorized the Secretary of the Interior to convey approximately 10 acres of land, heretofore withdrawn for reclamation purposes, to the Boulder City Cemetery Association for use as a cemetery.

Squatters on the public lands within the boundaries of the Anderson Ranch Reservoir site, Boise project, Idaho, will receive equitable relief under the act of June 26, 1944 (Public Law 450, 79th Cong., 2d sess.).

The Bureau of Reclamation's authority on the Colorado River was broadened by the act of June 28, 1946 (Public Law 469, 79th Cong., 2d sess.).

Personnel Recruitment and Training

Appointing authority to the Bureau of Reclamation was increased by the Secretary during the year just ended until it now includes all positions in the field service in grades CAF–13 and P–6 and below, with the exception of policy making and major supervisory positions. All this appointing authority was delegated by the Commissioner to the Chief Personnel Officer and, with certain limitations, to the regional offices.

During the past year, several new personnel services were initiated, including Bureau-wide standard employment practices and the launching of labor relations and safety programs. As these additional functions became organized, the appointing authority of the regions was increased to include

CAF–11 and P–4. By this action, approximately 95 percent of the personnel matters can be handled conclusively at their source, resulting in more rapid and efficient management of personnel.

The Office of the Chief Personnel Officer was charged with the responsibility of anticipating the personnel needs to meet the post-war programming of the Bureau. The number of Reclamation employees increased from 7,033 on June 30, 1945, to 14,362, June 30, 1946.

Veterans Fill New Positions

In collaboration with the Personnel Supervision and Management Division of the Office of the Secretary, plans were made effectively to administer the Veterans Preference Act of 1944. By the end of the fiscal year, with the rapid demobilization of the armed forces, practically all positions were being filled by veterans.

At the close of the fiscal year the Personnel Office was proceeding with the heavy responsibility of developing a staff of personnel to meet an unprecedented Reclamation program. Plans were outlined to employ several thousand technical and specialized engineers in the fields of hydrology, structural, mechanical, electrical, and civil engineering. Also being selected are economists, project planners, superintendents, and inspectors. Administrators capable of coordinating the planning and organization of such a program were recruited primarily by promotion from the nucleus staff maintained by the Bureau throughout the war and from former personnel returned from military service.

Employee Development Plans

Many long-range, practical training programs for Bureau employees have been initiated. The Guide to Employee Training, a handbook for new employees, has been published and is in use throughout the Bureau. Specialized needs of the Bureau required the undertaking of training to provide qualified chief clerks, concrete inspectors, and materials inspectors, and other types of employees. Training for disabled veterans has been authorized in an on-the-job basis within the Bureau, as well as job training for those employees eligible for benefits under the GI bill. Arrangements, on a cooperative basis between interested colleges and the Bureau, have been put into effect for employees to pursue a work-study plan. All of these plans are designed to attract and build a more productive staff.

During the past year there has been established in the Office of the Chief Personnel Officer a Central Board of United States Civil Service Examiners for the Bureau of Reclamation. As a central examining medium, this board operates within its stipulated function as a single agency for the purpose of serving the entire field service of the Bureau. The board has the responsibility for holding examinations, establishing registers, and certifying employees to positions in the field service of the Bureau. This function is executed in those specialized or technical fields peculiar to the agency, particularly for those which recruitment is to be made and registers established on a Nation-wide basis.

The Branches of Project Planning and Power Utilization and the Offices of Personnel and Finance were transferred to Washington during the fiscal year.

Personnel Changes

Notable among changes in the Bureau's top ranking personnel during the past year was the appointment of Michael W. Straus as Commissioner to succeed Harry W. Bashore, who retired after 39 years of service in the Bureau. Other important changes were the appointment of Richard L. Boke as Regional Director of region 2, Sacramento, Calif., to succeed Charles W. Carey, deceased, and the promotion of Assistant Regional Director R. J. Newell, region 1, Boise, Idaho, to fill the vacancy of Regional Director created by the transfer of Frank A. Banks to the Columbia Basin project as supervising engineer.

International Cooperation

In the interest of scientific and cultural cooperation the Bureau has made available design and construction methods to many foreign governments through technical papers, by visits of foreign engineers and technicians to Bureau projects and offices and through facilities of the Bureau training program. During the past year 219 requests for technical literature were received and 194 engineers and technicians from 29 foreign countries made 362 visits to the design and construction offices and projects. Of this number 35 engineers took extensive training in the design and construction offices and 20 of these completed a full year's work.

William L. Newmeyer, Chief of the Bureau's Resources and Development Division, was sent to Greece as a member of a special mission of the United Nations Food and Agricultural Organization to make a comprehensive study of the resources development possibilities and make a report for a program of reconstruction and economic development there.

In addition to this interest in the Bureau's technical accomplishments, representatives of foreign governments have displayed great interest in the Bureau's organization structure and administrative techniques. Organizational and administrative information have been provided for virtually all foreign governments concerned with irrigation and hydroelectric power developments.

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